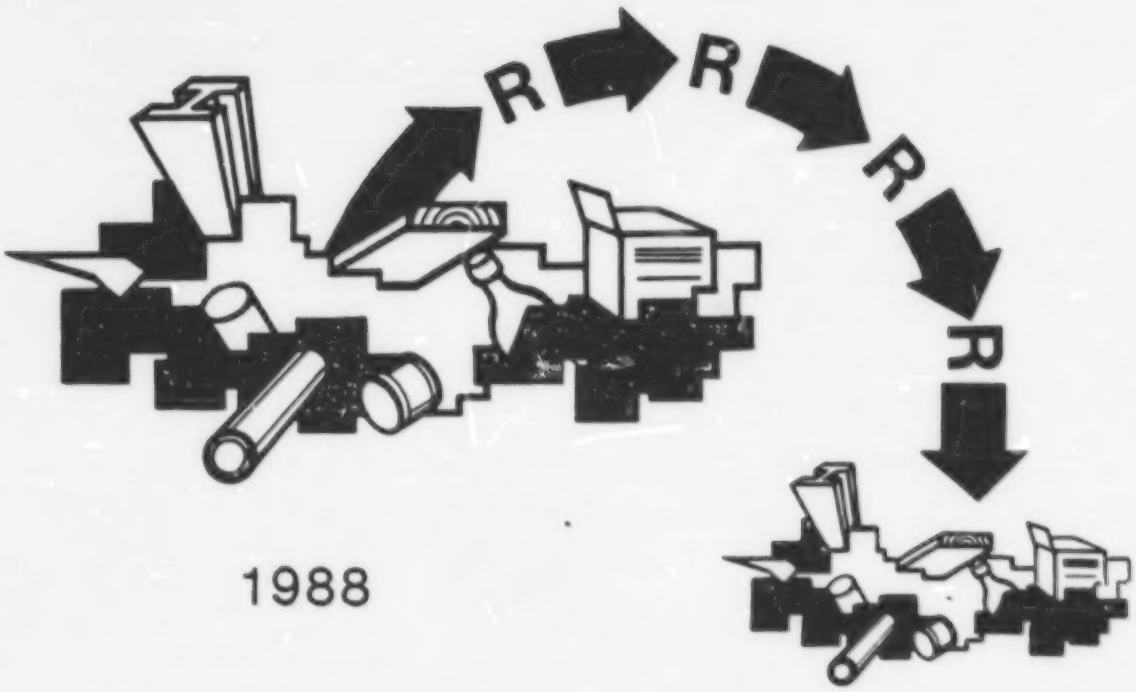
Canadian Council of Ministers of the Environment

CCME

Le Conseil canadien des ministres de l'environnement

Packaging Application In Canada



1988

2000

IP-112
May 1990

Packaging Application in Canada

92-00344/

Final Report to

National Packaging Task Force

recycled paper

May 1990
53906

MacLaren Engineers
Lavalin

PREFACE

This report is one of a series prepared for the National Packaging Task Force in support of the development a national packaging policy for Canada. The complete series of reports is as follows, together with the companies that prepared them:

• Packaging Application in Canada;	MacLaren Engineers Inc.
• Packaging Reduction, Reuse and Recycling Technology Options;	MacLaren Engineers Inc.
• Stakeholder Positions and Response to the Development of the National Packaging Protocol;	MWR and Associates
• Household Consumers and Packaging;	Resource Systems Management International
• Legislative Initiatives Relating to Packaging and Implications for the National Packaging Protocol;	Resource Systems Management International
• Economic Considerations in the Development of the National Packaging Protocol;	The Coopers and Lybrand Consulting Group
• Environmental Life Cycle of Packaging;	VHB Research and Consulting
• Agenda for Action for the National Packaging Protocol;	Recycling Development Corporation

The key data and analyses of each of these reports are included in a further report titled The Technical Basis For The National Packaging Protocol: Summary Report prepared by MacLaren Engineers Inc. Input to all reports has been received by M. J. Ramsay and Associates.

The National Packaging Task Force is a multi-stakeholder task force comprised of representatives from federal, provincial and territorial governments, municipalities, industry, environmental groups and consumer groups. The goal of the task force has been to develop and recommend to the Canadian Council of Ministers of the Environment a national packaging

policy for Canada.

In March 1990, the Canadian Council of Ministers of the Environment adopted the national packaging policy that was recommended to it by the National Packaging Task Force. The policy takes the form of a National Packaging Protocol that has been agreed to by all members of the task force. The National Packaging Protocol is included in this series of documents as Appendix A of The Technical Basis For The National Packaging Protocol: Summary Report.

REVIEW NOTICE

This report has been reviewed by the Conservation and Protection, and approved for publication. Approval does not necessarily signify that the contents reflect the views and policies of Environment Canada. Mention of trade names of commercial products does not constitute recommendation or endorsement for use.

This unedited version is undergoing a limited distribution to transfer the information to people working in related studies. This distribution is not intended to signify publication and, if the report is referenced, the author should cite it as an unpublished report of Environment Canada.

READERS COMMENTS

Readers who wish to comment on the content of this report should address their comments to:

David G. Hay
Office of Waste Management
Waste Management Branch
Environment Canada
Ottawa, Ontario
K1A OH3

TABLE OF CONTENTS

		Executive Summary	(i)
1.0		INTRODUCTION	1 - 1
2.0		DATA BASE AND METHODOLOGY FOR CHARACTERIZING CANADIAN PACKAGING APPLICATION	2 - 1
	2.1	The Data Base	2 - 1
	2.2	Methodology For Characterizing Packaging Applications In Canada	2 - 3
3.0		INDUSTRY EXPENDITURES ON PACKAGING IN CANADA	3 - 1
	3.1	Industry Demand For Packaging	3 - 1
	3.2	Supply Of Packaging To Industry	3 - 2
4.0		QUALITY OF PACKAGING USED IN CANADA	4 - 1
	4.1	Overall Use of Packaging By Industry	4 - 1
	4.2	Tonnage Of Packaging Used By Industry	4 - 1
5.0		CONCLUSIONS AND RECOMMENDATIONS	5 - 1

Appendices

Appendix A	Annual Gross Expenditures By Industry Sectors On Packaging Types 1979 - 1986
Appendix B	Proportional Annual Expenditures By Industry Sectors On Packaging Types 1970 - 1986
Appendix C	Estimated Tonnage of Packaging Used By Sector, 1988
Appendix D	Estimated Market For Packaging Type by Sector, 1988

List of Tables

		Follows Page
3.1	Total packaging Expenditures By Industry	3 - 1
3.2	Major Industry Sector Packaging Expenditures, 1986	3 - 2
3.3	Sales Of Packaging Type: 1979, 1986 and 2000	3 - 2
3.4	Largest Industry Purchases Of Each Packaging Type,1986	3 - 3
4.1	Packaging Type Used By Industry Sector	4 - 1
4.2	Estimated Packaging Use In Canada - 1988	4 - 2
4.3	Percentage of Total Packaging Use By Industry Sectors (1988)	4 - 3

List of Figure

		Follows Page
3-1	Value of Packaging Material As A Proportion Of Total Material Cost	3 - 1

Executive Summary

This document identifies expenditures by industry sectors in Canada on different packaging types during the 1979 - 1986 period. Based on this data, it is possible to estimate the tonnages of packaging used by industry, and to project packaging use by industry to year 2000.

The key conclusions of this study are as follows:

1) Total packaging expenditures by Canadian industry as a proportion of product value have remained relatively constant in the 1979 to 1986 period at approximately 3.5 percent of total material cost.

2) For most industry sectors, 80 percent of packaging expenditures are made on four or fewer types of packaging.

3) Reflecting overall expenditures on packaging, each industry sector typically utilizes relatively few packaging materials to meet a large majority of its packaging requirements.

4) There is a high level of concentration of the use of packaging in Canada. The five industry sectors who used the largest amounts of packaging in 1988 accounted for ann estimated 72 percent of all packaging used in Canada in that year; over 90 percent of packaging was used by twelve industry sectors.

5) An estimated 60 percent of packaging used in Canada in 1988 was industrial/commercial packaging. The remaining 40 percent is estimated to be consumer packaging.

The recommendations of this study are:

1) Action taken through the National Packaging Protocol to divert packaging from disposal should focus on specific industry sectors and the principal types of packaging they use.

2) Although different industry sectors may use similar packaging materials, different strategies will be required according to industry sector in order to achieve diversions from disposal. This is the case because of the different applications to which similar packaging materials may be put in different sectors, and the different regulatory, consumer demand and other factors that affect the application of packaging.

3) In light of the dominance of the food and beverage sectors in packaging use, they must be central in strategies to achieve overall diversions of packaging from disposal. Constraints on the source reduction and reuse of this packaging are significant, however.

4) Progress towards achieving packaging diversion targets may be most rapidly achieved in the short-term by addressing industrial packaging such as wood packaging and corrugated cartons/boxes. These packaging types have high potential for reuse and recycling, although realizing the opportunities available will require changes in the structure of the industries supplying the packaging and the development of infrastructures to ensure the diversion of this packaging from disposal.

5) The collection of the data that permitted the analyses in this report is not currently being undertaken. Environment Canada should discuss the re-introduction of the collection of this data with Statistics Canada and relevant industry associations as part of the overall data collection effort necessary to support the National Packaging Protocol.

1.0 INTRODUCTION

In April 1989, the Canadian Council of Ministers of the Environment (CCME) identified that a national approach was required regarding the management of packaging as part of a broader effort to reduce dependence on disposal options for the management of solid waste. Subsequently, a multi-stakeholder National Packaging Task Force was established to develop and recommend to CCME a national packaging policy.

This document is one of several technical reports that has been prepared in support of the development of the policy. The central purpose of the document is to characterize the use of packaging in Canada in terms of which industries use what types of packaging and in what quantity. This information will be important in the identification of actions that can be taken to reduce the amount of packaging requiring disposal and the economic and environmental implications of these actions.

The data base and methodology that has been used to characterize the application of packaging in Canada is briefly discussed in Section 2.0. In Section 3.0, overall industry expenditures on packaging are discussed. In Section 4.0, the application of packaging by industry sector is characterized according to the estimated tonnes of each packaging material used by each sector. Conclusions and recommendations are presented in Section 5.0.

2.0 DATA BASE AND METHODOLOGY FOR CHARACTERIZING CANADIAN PACKAGING APPLICATION

2.1 The Data Base

Packaging in Canada is used by thousands of companies in 22 Standard Industrial Classification (SIC) groups. Packaging itself may be made from any of six basic materials, or composites thereof, each of which is designed in form, material content and size to fulfil specific purposes for specific products. Consequently, a vast array of different packaging formats are used daily in Canada for purposes ranging from the bulk shipment of industrial feedstocks to the protection of highly sensitive health care equipment and the sale of single-serving snacks and beverages.

Several governmental, industrial, academic and other non-governmental organizations can provide data on the application of some types of packaging in some types of application. Typically, this data is either too narrow in focus for a study of the breadth necessary to support development of a national packaging policy, or is incomplete, or the credibility of the data is disputed because of assumptions that have been made in the preparation of the data.

Because of these problems, the data base used to characterize the application of packaging in Canada is Statistics Canada time-series data on the expenditures of industry on packaging in the 1979-1986 period. During this period, Statistics Canada collected annual data on industry expenditures on packaging according to industry sector expenditure on packaging types. Collection of these data ceased at the end of 1986.

There are several advantages to using the Statistics Canada data. Principle among these, it is the only data source that covers all packaging purchased by Canadian industry over a period of several years. In addition, the data is non-partisan and enjoys high credibility by all stakeholders in the development and implementation of a national packaging policy. Finally, the data-base provides a break-down of packaging expenditures according to SIC group and thus permits the level of specificity necessary to characterize packaging application in Canada.

While the Statistics Canada data-base is the most appropriate for the analysis undertaken in this document, it has four short-comings that limit its utility. Most importantly, the data-base records dollar purchases of packaging by Canadian industry; for the purposes of the development of a national packaging policy, a more useful measure would relate to the tonnage of packaging used by the various industry groups. This short-coming has been addressed through a data manipulation methodology discussed in section 2.2, and section 4.0.

A second short-coming of the data is that the trade of packaging as packaging-in-use is not recorded. Consequently, the data-base cannot be regarded as a comprehensive record of packaging use in Canada; it is only a record of Canadian expenditures on packaging. While Canada's traditional position as a net importer of finished products (and therefore the packaging-in-use associated with them) would suggest that this country is a net importer of packaging-in-use, whether this is in fact the case and to what extent are unknown.

Two other factors complicate interpretation of the data base. The reporting of packaging expenditure data to Statistics Canada during the 1979-1986 period was subject to the Statistics Canada Confidentially Act. Some companies chose not to report packaging expenditure data and for some years data is incomplete for some SIC groups. While this may preclude analysis of some details of packaging application, it does not prevent analysis of broad patterns of expenditures on packaging.

Finally, the classification under which packaging expenditures have been reported have changed over time in some instances. Until 1983, expenditures by the food and beverage industries on packaging were included within a combined food and beverage industry category; starting in 1983, expenditures are broken out for the food and beverage industries separately. Also until 1983, expenditures by the rubber and plastics products industries were included within a combined category; starting in 1983, expenditures for these industries have also been broken out separately. The classification of companies within the primary textile, textile products and clothing industries sectors also changed in the 1983 reporting year, as did the classification of companies between the machinery industry and transportation industry sectors.

2.2 Methodology For Characterizing Packaging Applications In Canada

The Statistics Canada data-base can be used to identify:

- the value of packaging as a proportion of value of product;
- patterns of overall expenditures on packaging by industry sectors over the 1979-1986 period;
- patterns of overall expenditures on packaging types over the 1979-1986 period;
- the range of packaging used by each industry sector; and
- the major industrial purchasers of each type of packaging.

These characteristics of packaging application can be determined either by analysis of actual dollar expenditures on packaging, or by converting dollar values to percentages of total expenditures. These analyses are presented in Section 3.

The estimation of the tonnage of packaging used by each industry sector requires conversion of the dollar value data-base into tonnage data. The dollar value of expenditures by each industry sector on each packaging material is known from the Statistics Canada data base.Data is available from a companion report in this series of reports supporting development of a national packaging policy (Packaging Reduction, Reuse And Recycling Technology Options) regarding the total amount of packaging material used in 1988.

By making the assumption that the proportion of industry sector expenditures on each packaging material is proportional to the amount of that packaging material used by each sector, it is possible to estimate the tonnage of each packaging material used by each industry sector. This methodology is discussed in more detail in Section 4, where conclusions are drawn regarding the estimated amounts of each type of packaging used by each industry sector. It is then possible to identify the significance of each industry sector in the

implementation of the national packaging policy, and which materials within each sector are of particular importance.

3.0 INDUSTRY EXPENDITURES ON PACKAGING IN CANADA

Industry expenditures on packaging can be viewed in two general ways. First, expenditures on packaging can be viewed from an overall industry perspective. This view identifies packaging expenditures as a proportion of product value and as the gross expenditure of each industrial sector on packaging. The major types of packaging purchased by each industry sector in terms of dollar value can be determined.

Second, expenditures can be viewed from a packaging materials perspective. This view identifies total sales to industry of different packaging types and the major industrial purchasers of each packaging type.

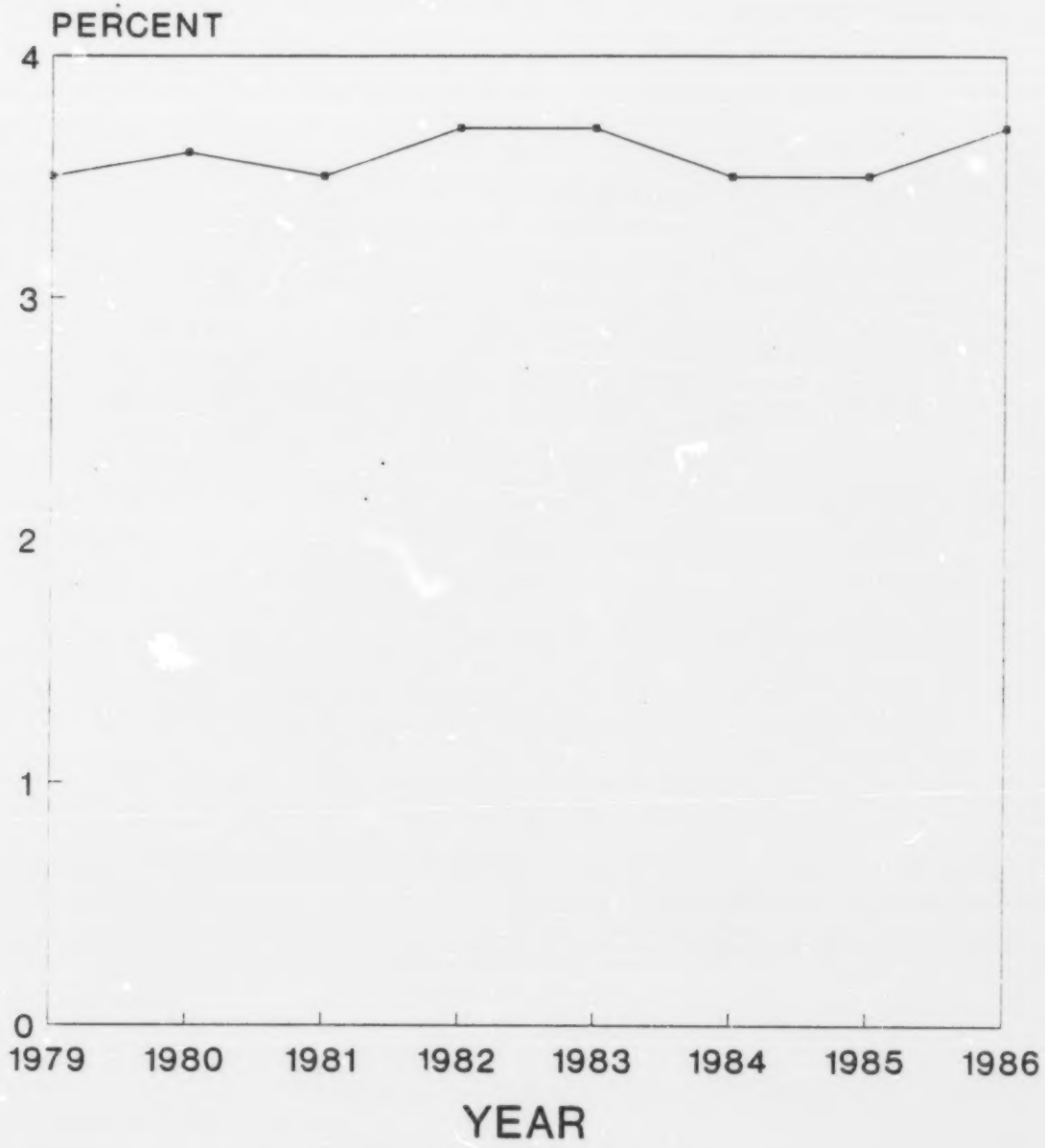
These analyses are important not only because they identify use of packaging, but also because they provide insights into the strength and importance of the economic relationships between packaging suppliers and manufacturing industry. The tonnage of packaging materials used by industry is addressed in Section 4.0.

3.1 Industry Demand For Packaging

The Value of Packaging as a Proportion of Product Value The value of packaging as a proportion of the cost of materials and supplies used in all manufacturing industries is given by Figure 3-1. As is shown in Figure 3-1 packaging material costs as a percentage of total costs of materials and supplies used fluctuated around 3.5% over the 1979-1086 period. Although data is not available beyond 1986, discussions with industry indicate that major changes have not occurred in the value of packaging as a proportion of the cost of materials and supplies.

Total Industry Ex ..ditures on Packaging Table 3.1 summarizes total packaging material expenditure by industry sector for the years 1979-1986. During this period, overall industry expenditures increased from $3.1 billion to almost $5.4 billion. Growth in expenditures has not been evenly distributed, however. While most sectors have shown growth in packaging

FIGURE 3-1
VALUE OF PACKAGING MATERIAL AS A PROPORTION OF TOTAL MATERIAL COST



Source: Statistics Canada

TABLE 3.1

TOTAL PACKAGING EXPENDITURES BY INDUSTRY
($'000)

INDUSTRY SECTOR \ YEAR	1979	1980	1981	1982	1893	1984	1985	1986
FOOD INDUSTRIES	1771789	2014870	2299260	2459200	1795308	1898939	1980524	2037661
BEVERAGE INDUSTRIES	-	-	-	-	812244	875385	991742	1083888
TOBACCO PRODUCTS INDUSTRIES	98766	106418	126566	134533	129909	133784	141074	136360
RUBBER PRODUCTS INDUSTRIES	53988	56761	65658	65614	16424	19585	18348	19577
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	69304	78222	77677	90115
LEATHER AND ALLIED INDUSTRIES	11806	12425	16251	14545	16627	18673	18468	18104
PRIMARY TEXTILE INDUSTRIES	58591	62406	71963	63436	30503	28690	29469	31888
TEXTILE PRODUCTS INDUSTRIES	14025	16539	19028	16275	41062	43271	43008	47013
CLOTHING INDUSTRIES	26069	26696	28756	28247	46878	48329	49254	53075
WOOD INDUSTRIES	45421	52565	58939	57338	73018	79894	89414	94374
FURNITURE AND FIXTURE INDUSTRIES	41317	45572	54742	44782	49692	55215	56812	65118
PAPER AND ALLIED PRODUCTS INDUSTRIES	174239	208512	233708	244062	256250	279377	303999	335626
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	21075	25205	29311	30618	32937	37268	39865	43296
PRIMARY METAL INDUSTRIES	37242	40856	42889	40460	43756	52387	52378	55311
FABRICATED METAL PRODUCTS	78415	81369	86167	74431	78686	79651	82725	89186
MACHINERY INDUSTRIES	25911	30402	29373	26182	17725	20986	21043	21569
TRANSPORTATION EQUIPMENT INDUSTRIES	36915	32780	36523	40102	60658	78134	81304	89737
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	73469	82937	93371	85155	105926	121032	128341	128515
NON-METALIC MINERAL PRODUCTS INDUSTRIES	69640	82519	91843	88893	100065	109755	119341	126623
REF . ED PETROLEUM AND COAL PRODUCTS IND.	42640	56987	60118	51207	46456	47144	44355	44329
CHE .CAL AND CHEMICAL PRODUCTS INDUSTRIES	397276	464550	493010	488387	567956	620011	692279	727569
OTHER MANUFACTURING INDUSTRIES	48044	51943	56247	56669	63074	77570	60487	59038
DOLLAR VALUE ($'000)	3126638	3552312	3993723	4110136	4454457	4803302	5121907	5397972

1) Projected dollar values are in 1986 dollars.
2) Projections do not account for effects, if any, by GATT, FTA and any other f|
3) Values do not include imports of "packaging in use".

expenditures, the tobacco industry, rubber industry, leather and allied products industry, primary textile industry, and petroleum and coal products industry sectors have either not shown significant growth, or have shown decline in packaging expenditures in the 1983-1986 period. Packaging expenditures by these industries have been flat or negative during this time even though the economy as a whole was healthy and inflation was at the 5 percent per year level or higher.

Major Packaging Expenditures By Industry Sector Table 3.2 identifies the five packaging types on which the greatest expenditures were made by each sector in 1986. Expenditures are expressed in percent of total packaging expenditures by each sector. For example, the five largest packaging expenditures of the food industry in 1986 were on folding and set-up boxes, corrugated boxes and cartons, metal cans, glass bottles and carboys and transparent film, which accounted for 72.2 percent of all food industry packaging expenditures. Appendix A provides a detailed profile of industry expenditures on packaging in the 1979-1986 period.

Table 3.2 indicates that industry sectors exhibit a high degree of concentration of packaging expenditures in particular packaging types. The data in the table identify that the five largest packaging expenditures of each industry sector account for at least 70 percent of all packaging expenditures for all but two sectors. Even after discounting the "miscellaneous" category for those sectors for which it is one of the five largest categories of packaging expenditure, the remaining categories of packaging expenditure amount to at least 70 percent of total packaging expenditures for all but four sectors.

3.2 Supply Of Packaging To Industry

Value of The Packaging Industry Table 3.3 identifies the value of each packaging type purchased by industry in 1979 and 1986 and projects the value of packaging that will be purchased in year 2000. As this table indicates, there has been considerable variation in annual growth rates over the 1979-1986 period. Overall, however, growth over the period averaged 8.7 percent per year. Projection of this growth rate to year 2000 implies that the value of expenditures on packaging will be in the $18 billion range at that time.

TABLE 3.2

MAJOR INDUSTRY SECTOR PACKAGING EXPENDITURES, 1986

(Percent of Total Sector Expenditures on Packaging)

PACKAGING TYPE	FOOD INDUSTRY	BEVERAGE INDUSTRY	TOBACCO PRODUCTS	RUBBER PRODUCTS	PLASTIC PRODUCTS	LEATHER PRODUCTS	PRIMARY TEXTILE	TEXTILE PRODUCTS	CLOTHING INDUSTRY	WOOD INDUSTRY	FURNITURE INDUSTRY
FOLDING AND SET-UP BOXES	15.3		55.3	8.3	17.4	35.5	5.4	21.1	18.3 (1)		20.7
CORRUGATED BOXES AND CARTONS	15.7	12.6	4.7	31.5	45.7	50.1	50.1	24.9	25.0	6.2	56.6
CANS, METAL	20.6	33.0	5.8								
BARRELS AND DRUMS, METAL (one way shippers)											
GLASS BOTTLES AND CARBOYS	7.2	23.3									
PAPER BAGS, ALL KINDS											
PAPER AND PAPERBOARD				10.7		2.0	4.6			12.8	7.5 (2)
WOOD					7.6					1.5	0.9
METAL/PLASTIC (closures, staples, strapping, wire)		10.5			6.9					50.5	
PLASTIC CONTAINERS, BOTTLES AND CARBOYS											
TRANSPARENT FILM (bags, sheets, and rolls)	13.4		3.4		10.9		8.0	18.9	13.5	10.0	
FOIL/LABELS/TAGS/WRAPPERS			18.9	13.5		5.8		9.1	8.5		2.9
MISCELLANEOUS		6.3		13.5		6.0	6.6	9.5	12.6		
PERCENT OF TOTAL PACKAGING EXPENDITURES ACCOUNTED FOR BY EXPENDITURES ON FIVE LARGEST PACKAGING TYPES	72.2	85.7	88.1	87.8	88.5	99.4	74.7	83.5	77.9	81.0	96.1

NOTES: (1) Includes paper/paperboard packaging
(2) Includes transparent film

TABLE 3.2 (con't)

MAJOR INDUSTRY SECTOR PACKAGING EXPENDITURES, 1986

(Percent of Total Sector Expenditures on Packaging)

PACKAGING TYPE	PAPER INDUSTRY	PRINTING/ PUBLISHING	PRIMARY METALS	FABRICATED METALS	MACHINERY INDUSTRY	TRANSPORTATION EQUIPMENT	ELECTRICAL/ ELECTRONICS	NON-METALLIC MINERAL PRODUCTS	REFINED PETROLEUM AND COAL PRODUCTS	CHEMICAL INDUSTRY	OTHER MANUFACTURING
FOLDING AND SET-UP BOXES	14.1	27.1	9.9	14.1	14.3	17.1	12.2			9.3	26.8
CORRUGATED BOXES AND CARTONS	21.8	30.8		39.4	38.1	38.1	46.4	48.3	8.1	11.2	44.1
CANS, METAL			3.1						10.4	16.1	
BARRELS AND DRUMS, METAL (one way shippers)									26.5		
GLASS BOTTLES AND CARBOYS											
PAPER BAGS, ALL KINDS								10.4			
PAPER AND PAPERBOARD	24.1	12.7									15.0
WOOD		6.5		18.9	28.4	18.5	10.1	12.5			
METAL/PLASTIC (closures, staples, strapping, wire)	13.8		19.7	14.0	13.6	13.6	9.5	7.6	13.3	10.6	
PLASTIC CONTAINERS, BOTTLES AND CARBOYS									23.0		
TRANSPARENT FILM (bags, sheets, and rolls)			3.7			2.9		11.5			
FOIL/LABELS/TAGS/WRAPPERS											2.9
MISCELLANEOUS	10.4	10.4	8.0	8.0	1.7		10.6			7.0	2.6
PERCENT OF TOTAL PACKAGING EXPENDITURES ACCOUNTED FOR BY EXPENDITURES ON FIVE LARGEST PACKAGING TYPES	84.2	87.5	44.4	94.4	96.1	90.5	88.8	90.3	81.3	54.4	91.4

TABLE 3.3

SALES OF PACKAGING TYPE:
1979, 1986 AND 2000 (PROJECTED)

PACKAGING TYPE	1979		1986		RANGE OF ANNUAL GROWTH 1979-1986 (%) (1)	AVERAGE ANNUAL % GROWTH	2000	
	($'000)	% TOTAL	($'000)	% TOTAL			($'000)	% TOTAL
FOLDING AND SET-UP BOXES	384,806	12.3	673,593	12.5	(0.1) - 28.5	8.7	2,166,000	12.0
CORRUGATED BOXES AND CARTONS	592,388	18.9	996,798	18.5	5.7 - 13.4	7.7	2,816,000	15.6
CANS, METAL	562,057	17.9	910,525	16.9	(1.6) - 14.3	7.3	2,276,000	12.6
BARRELS AND DRUMS, METAL (one way shippers)	37,047	1.2	47,566	0.9	(3.1) - 11.9	3.8	77,000	0.4
GLASS BOTTLES AND CARBOYS	296,695	9.4	434,568	8.1	(1.3) - 13.5	5.7	893,000	4.9
PAPER BAGS, ALL KINDS	62,807	2.0	91,997	1.7	(1.0) - 14.9	5.7	189,000	1.0
PAPER AND PAPERBOARD	94,377	3.0	200,742	3.7	(2.2) - 72.1	13.4	1,026,000	5.7
WOOD	94,293	3.0	137,736	2.6	(15.7) - 17.4	6.0	294,000	1.6
METAL/PLASTIC (closures, staples, strapping, wire)	167,880	5.3	449,437	8.3	9.1 - 23.2	13.6	2,358,000	13.1
PLASTIC CONTAINERS, BOTTLES AND CARBOYS	136,303	4.3	374,715	6.9	12.2 - 23.6	17.3	2,982,000	16.5
TRANSPARENT FILM (bags, sheets and rolls)	206,698	6.6	394,610	7.3	(3.6) - 21.6	10.2	1,395,000	7.7
FOIL/LABELS/TAGS/WRAPPERS	218,511	7.0	293,959	5.4	(12.4) - 16.6	7.4	692,000	3.8
MISCELLANEOUS	285,882	9.1	391,719	7.3	(20.9) - 15.6	6.6	899,000	5.0
GRAND TOTAL	3,139,744	10(.0	5,397,965	100.0	(2.9 - 13.6)	8.7	18063000	100.0

1) Bracketed values indicate negative annual growth
2) Projections do not account for effects, if any, by CATT, FTA and any other future initiatives which may affect the manufacturing sec
3) Values do not include imports of "packaging in use".

Based on the growth projection identified in Table 3.3, plastic containers, bottles and carboys will be the largest packaging sector in year 2000 in terms of dollar expenditures. When plastic transparent film is added to this category, approximately 25 percent of packaging expenditures in year 2000 will be on plastics packaging. However, in spite of their generally slower rates of growth over the period, expenditures on paper/paperboard based packaging (including folding/set-up boxes, corrugated cartons, paper bags, and paper and paperboard) will continue to dominate and will comprise approximately 45 percent of the packaging market in year 2000.

Major Purchasers of Packaging Types Table 3.4 identifies the five major industrial purchasers of each packaging type. The table shows there is significant concentration in the purchasers of each packaging type: at least 70 percent of the purchases of all but three packaging types are accounted for by five industry sectors. Four packaging types (metal barrels and drums, glass bottles and carboys, paper bags, transparent film) rely on one industry sector for at least half of their sales, and every packaging type, with the exception of wood, relies on at least one industry sector for between one-quarter and one-half of its sales. Complete data on the proportion of each packaging type used by each industry sector is provided in Appendix B.

Comparison of the data in Table 3.2 with the data in Table 3.4 illustrates that the economic importance of an industry sector to a packaging type is not the same as the economic importance of a packaging type to an industry sector. From Table 3.2, for example, 15.3 percent of food industry packaging expenditures went to the purchase of folding carton and set-up boxes; this represented 46.2 percent of the total sales of folding cartons and set-up boxes, however. (Table 3.4). Comparison of data in this way may be useful in determining the relative economic impacts on packaging suppliers and packaging purchasers of actions to change the way packaging is managed.

TABLE 3.4

LARGEST INDUSTRY PURCHASERS OF EACH PACKAGING TYPE, 1986

(Percent of Total Sales of Packaging Type)

PACKAGING TYPE / INDUSTRY SECTOR	FOLDING/ SET UP BOXES	CORRUGATED CARTON/ BOXES	METAL CANS	METAL BARRELS & DRUMS	GLASS BOTTLES & CARBOYS	PAPER BAGS	PAPER/ PAPERBOARD
FOOD INDUSTRY	46.2	31.9	46.1	3.0	33.9	68.4	23.0
BEVERAGE INDUSTRY	5.3		39.2		58.1		
TOBACCO INDUSTRY	11.1	13.6	0.9				
RUBBER PRODUCTS							
PLASTIC PRODUCTS							
LEATHER PRODUCTS							
PRIMARY TEXTILES							
TEXTILE PRODUCTS							
CLOTHING INDUSTRY							4.9
WOOD INDUSTRY							5.9
FURNITURE INDUSTRY						0.5	
PAPER INDUSTRY	7.0	7.3					40.0
PRINTING/PUBLISHING							
PRIMARY METALS				3.0			
FABRICATING METALS						0.5	
MACHINERY INDUSTRY							
TRANSPORTATION EQUIPMENT							
ELECTRICAL/ELECTRONICS							
NON-METALLIC MINERAL PRODUCTS		6.1				14.0	
REFINED PETROLEUM/COAL PRODUCTS			0.6	25.5			
CHEMICAL PRODUCTS	10.1	8.1	12.8	68.1	8.0	14.1	
OTHER MANUFACTURING							4.8
PERCENT OF TOTAL SALES ACCOUNTED FOR BY THE FIVE LARGEST PURCHASERS OF EACH PACKAGING TYPE	79.7	67.0	99.6	99.6	100.0	97.5	78.6

NOTES: (1) Includes paper/paperboard packaging
(2) Includes transparent film

TABLE 3.4 (con't)

LARGEST INDUSTRY PURCHASERS OF EACH PACKAGING TYPE, 1986

(Percent of Total Sales of Packaging Type)

PACKAGING TYPE / INDUSTRY SECTOR	WOOD	METAL/PLASTIC CLOSURES/ STRAPPING ETC	PLASTIC CONTAINERS	TRANSPARENT FILM	FOILS/ LABELS & WRAPPERS	MISCELLANEOUS
FOOD INDUSTRY		14.2	13.9	68.8	35.5	27.8
BEVERAGE INDUSTRY		25.3	12.5		21.9	17.3
TOBACCO INDUSTRY			0.8		9.8	
RUBBER PRODUCTS						
PLASTIC PRODUCTS				2.5		
LEATHER PRODUCTS						
PRIMARY TEXTILES						
TEXTILE PRODUCTS						
CLOTHING INDUSTRY						
WOOD INDUSTRY		10.6				
FURNITURE INDUSTRY						
PAPER INDUSTRY	9.4	10.2		5.3		12.0
PRINTING/PUBLISHING						
PRIMARY METALS						
FABRICATING METALS	12.3					
MACHINERY INDUSTRY						
TRANSPORTATION EQUIPMENT	11.9					3.6
ELECTRICAL/ELECTRONICS	9.3				2.6	
NON-METALLIC MINERAL PRODUCTS	11.4			3.7		
REFINED PETROLEUM/COAL PRODUCTS			2.6			
CHEMICAL PRODUCTS		17.4	9.9	4.0	14.3	13.0
OTHER MANUFACTURING						
PERCENT OF TOTAL SALES ACCOUNTED FOR BY THE FIVE LARGEST PURCHASERS OF EACH PACKAGING TYPE	54.3	77.7	65.0	84.3	84.1	77.0

NOTES: (1) Includes paper/paperboard packaging
(2) Includes transparent film

4.0 QUANTITY OF PACKAGING USED IN CANADA

4.1 Overall Use of Packaging By Industry

Table 4.1 identifies which industry sectors used what types of packaging in 1986. All sectors used at least several different packaging types, but only two (the food industry and the chemical and chemical products industry) used all packaging types. As indicated in Section 3, however, expenditures on different packaging types varies widely. Estimates are made in Section 4.2 of the tonnage of packaging used by each sector.

4.2 Tonnage Of Packaging Used By Industry

Estimates of the amount of packaging used by industry in 1988 are given in Table 4.2. The methodology used to develop these estimates is based on the assumption that the tonnage of each type of packaging used by each industry sector is proportional to the expenditures of that sector on each packaging type.

Data in Appendix B present the total annual expenditure by industry on each packaging type during the 1979-1986 period. These data also present the proportion of total industry expenditure on each packaging type by individual sectors. From these data, it is possible to project 1988 industry expenditure on each packaging type based on average annual growth rates. It is also possible to project the proportion of these total expenditures accounted for byu each sector in 1988.

Data on the total tonnage of each packaging type used in 1988 are detailed in Packaging Reduction, Reuse and Recycling Technology Options, a companion report to this document prepared in support of the development of a national packaging policy; these data are summarized in Appendix C. Using these data, together with data in Appendix B, the following

TABLE 4.1

PACKAGING TYPE USED BY INDUSTRY SECTOR

INDUSTRY SECTOR \ PACKAGING TYPE	FOLDING AND SET-UP BOXES PAPERBOARD	CORRUGATED BOXES AND CARTONS	CANS (METAL)	BARRELS AND DRUMS (METAL ONE-WAY SHIPPERS)	GLASS BOTTLES JARS AND CARBOYS	PAPER BAGS ALL TYPES
FOOD INDUSTRIES	X	X	X	X	X	X
BEVERAGE INDUSTRIES	X	X	X	-	X	-
TOBACCO PRODUCTS INDUSTRIES	X	X	X	-	-	-
RUBBER PRODUCTS INDUSTRIES	X	X	X	X	-	-
PLASTIC PRODUCTS INDUSTRIES	X	X	-	X	-	-
LEATHER AND ALLIED INDUSTRIES	X	X	-	-	-	-
PRIMARY TEXTILE INDUSTRIES	X	X	-	-	-	X
TEXTILE PRODUCTS INDUSTRIES	X	X	-	-	-	-
CLOTHING INDUSTRIES	X	X	-	-	-	-
WOOD INDUSTRIES	X	X	-	-	-	X
FURNITURE AND FIXTURE INDUSTRIES	X	X	-	-	-	X
PAPER AND ALLIED PRODUCTS INDUSTRIES	X	X	X	-	-	X
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	X	X	-	-	-	-
PRIMARY METAL INDUSTRIES	X	X	-	X	-	X
FABRICATED METAL PRODUCTS	X	X	X	X	-	X
MACHINERY INDUSTRIES	X	X	-	X	-	-
TRANSPORTATION EQUIPMENT INDUSTRIES	X	X	-	-	-	-
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	X	X	X	-	-	-
NON-METALIC MINERAL PRODUCTS INDUSTRIES	X	X	X	X	-	X
REFINED PETROLEUM AND COAL PRODUCTS IND.	X	X	X	X	-	-
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	X	X	X	X	X	X
OTHER MANUFACTURING INDUSTRIES	X	X	X	X	-	X

TABLE 4.1 (CON'T)

PACKAGING TYPE USED BY INDUSTRY SECTOR

INDUSTRY SECTOR \ PACKAGING TYPE	PAPER AND PAPERBOARD	WOOD (PALLETS, SKI BOXES, BARREL KEGS)	METAL/PLASTIC (CLOSURES, STABLES, WIRE STRAPPING	PLASTIC (CONTAINERS, BOTTLES, CARBOYS)	TRANSPARENT FILM (BAGS, SHEETS, ROLLS)	FOIL, LABELS TAGS, WRAPPER	MISCELLANEOUS
FOOD INDUSTRIES	X	X	X	X	X	X	X
BEVERAGE INDUSTRIES	-	X	X	X	X	X	X
TOBACCO PRODUCTS INDUSTRIES	X	-	X	X	X	X	X
RUBBER PRODUCTS INDUSTRIES	X	X	X	X	X	X	X
PLASTIC PRODUCTS INDUSTRIES	X	X	X	-	X	X	X
LEATHER AND ALLIED INDUSTRIES	X	-	-	-	X	X	X
PRIMARY TEXTILE INDUSTRIES	X	X	X	X	X	X	X
TEXTILE PRODUCTS INDUSTRIES	X	X	X	X	X	X	X
CLOTHING INDUSTRIES	X	-	X	-	X	X	X
WOOD INDUSTRIES	X	X	X	-	X	X	X
FURNITURE AND FIXTURE INDUSTRIES	X	X	X	-	X	X	X
PAPER AND ALLIED PRODUCTS INDUSTRIES	X	X	X	-	X	X	X
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	X	X	X	-	X	X	X
PRIMARY METAL INDUSTRIES	X	X	X	-	X	X	X
FABRICATED METAL PRODUCTS	X	X	X	X	X	X	X
MACHINERY INDUSTRIES	X	X	X	-	X	X	X
TRANSPORTATION EQUIPMENT INDUSTRIES	X	X	X	-	X	X	X
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	X	X	X	X	X	X	X
NON-METALIC MINERAL PRODUCTS INDUSTRIES	X	X	X	X	X	X	X
REFINED PETROLEUM AND COAL PRODUCTS IND.	-	X	X	X	-	X	X
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	X	X	X	X	X	X	X
OTHER MANUFACTURING INDUSTRIES	X	X	X	X	X	X	X

calculation can be used to estimate the amount of each packaging type used by each sector in 1988:

Total tonnage of packaging type used by each sector in 1988.	=	Total tonnage of packaging type used by industry in 1988.	X	Proportion of total industry expenditure on packaging type accounted for by each sector.

The following example illustrates this calculation. In 1988, 749,580 tonnes of folding cartons and set-up boxes are estimated to have been used by industry (Appendix C). From data in Appendix B, it is projected that the food industry sector accounted for 44.5 percent of all industry expenditures on folding cartons and set-up boxes. Therefore:

Total tonnage of folding cartons and set-boxes used by the food industries in 1988.	=	749,580 tonnes x 44.5 percent

Therefore, the food industry is projected to have used 333, 563 tonnes of folding cartons and set-up boxes in 1988.

Using the methodology, the total tonnages of each packaging type estimated to have bee used by each industry sector are identified in Appendix C. These tonnages can then be added together to estimate the total tonnages of packaging used by each industry sector in 1988. These data are given in Table 4.2, together with the percentage of the total tonnage of packaging used in 1988 accounted for by each sector, and the ranking each sector holds.

Table 4.2 also identifies the estimated total packaging expenditures of each industry sector, and its ranking, in 1988. These values have ben extrapolated from the trends in expenditure identified by the data in Table 3.1.

TABLE 4.2

ESTIMATED PACKAGING USE IN CANADA, 1988
(000's tonnes)

INDUSTRY SECTOR	Total Tonnage	Percentage of Tonnage Used (%)	Rank by Tonnage Used	Projected Packaging Expenditure, 1988 $000's	Ranking by Expenditure	Tonnes of Packaging per $1000 of Expenditure	Ranking by Packaging per $1000 of Expenditure
FOOD INDUSTRIES	1,855,271	32.5	1	2389000	1	0.78	17
BEVERAGE INDUSTRIES	1,004,985	17.6	2	1333000	2	0.75	16
TOBACCO PRODUCT INDUSTRIES	109,149	1.9	12	149000	7	0.73	18
RUBBER PRODUCT INDUSTRIES	23,465	0.4	19	22000	21	1.07	12
PLASTIC PRODUCT INDUSTRIES	131,396	2.3	10	109000	10	1.21	10
LEATHER AND ALLIED PRODUCT INDUSTRIES	21,503	0.4	21	21000	22	1.02	15
PRIMARY TEXTILE INDUSTRIES	20,017	0.4	22	34000	19	0.59	21
TEXTILE PRODUCT INDUSTRIES	63,330	1.1	16	51000	17	1.24	9
CLOTHING INDUSTRIES	59,583	1.0	17	58000	15	1.03	14
WOOD INDUSTRIES	77,023	1.4	15	120000	8	0.64	20
FURNITURE AND FIXTURE INDUSTRIES	89,223	1.6	13	74000	12	1.21	11
PAPER AND ALLIED PRODUCT INDUSTRIES	439,139	7.7	4	414000	6	1.06	13
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	166,068	2.9	8	55000	16	3.02	1
PRIMARY METAL INDUSTRIES	79,739	1.4	14	62000	13	1.29	7
FABRICATED METAL INDUSTRIES	164,619	2.9	9	92000	11	1.79	4
MACHINERY INDUSTRIES	45,154	0.8	18	25000	20	1.81	3
TRANSPORTATION EQUIPMENT INDUSTRIES	202,275	3.5	6	116000	9	1.74	5
ELECTRICAL/ELECTRONIC PRODUCT INDUSTRIES	199,149	3.5	7	152000	6	1.31	8
NON-METALIC MINERAL PRODUCT INDUSTRIES	242,354	4.2	5	153000	5	1.58	6
REFINED PETROLEUM AND COAL PRODUCT INDUSTRIES	19,790	0.3	20	45000	18	0.44	22
CHEMICAL AND CHEMICAL PRODUCT INDUSTRIES	571,880	10.0	3	880000	3	0.65	19
OTHER MANUFACTURING INDUSTRIES	119,431	2.1	11	62000	13	1.93	2
	5704544	100		6416000		0.89	

While there are similarities in the ranking of industry sectors as measured by dollar expenditures on packaging and tonnage of packaging used, the dominance of the top five sectors as measured by tonnage used is not quite as great as the top five sectors as measured by dollar expenditures. Data in Table 3.3 indicate that the food and beverage industries accounted for an estimated 50.5 percent of tonnage of packaging used in 1988, while accounting for an estimated 58.0 percent of dollar expenditures on packaging in 1988. As a group, the top five sectors as measured by tonnage accounted for an estimated 72 percent of all packaging by weight in 1988; the top five sectors as measured by dollar expenditure accounted for an estimated 80 percent of expenditures on packaging in 1988.

Finally, Table 4.2 presents data regarding the tonnes of packaging estimated to be used by each industry sector per $1000 of industry expenditure. Across industry as a whole, 0.83 tonnes of packaging is estimated to have been used in 1988 per $1000 of expenditure. There is wide variation among industry sectors in the tonnage of packaging used per $1000 of expenditure, however, and the sector with the highest tonnage of packaging use per $1000 of expenditure uses an estimated seven times the weight of the sector with the lowest tonnage of packaging use per $1000 of expenditure.

The data regarding the tonnes of packaging estimated to be used by each industry sector per $1000 of expenditure requires careful interpretation. A high ranking in this regard does not necessarily imply "over packaging" or "excess packaging"; it may simply imply that an industry sector uses inexpensive packaging materials that are heavy; for five of the top six industries in this ranking, wood is the dominant packaging type. The four largest users by tonnage of packaging rank among the bottom half of industry sectors when ranked according to tonnes of packaging per $1000 of expenditure, indicating relatively expensive packaging compared with the weight of the packaging used.

Table 4.3 identifies the proportions of each packaging type used by each industry sector whose total packaging use in 1988 is estimated to have exceeded 95,000 tonnes. This includes the twelve largest packaging users from Table 3.3; these industry sectors used 91.4 percent of the tonnage of packaging estimated to have been used in Canada in 1988.

TABLE 4.3

PERCENTAGE OF TOTAL PACKAGING USE BY INDUSTRY SECTORS
(1988)

INDUSTRY SECTOR	Folding and Set-Up Boxes (% of total pkg for this industry)	Corrugated Boxes and Cartons (% of total pkg for this industry)	Cans, metal (% of total pkg for this industry)	Barrels and Drums (% of total pkg for this industry)	Glass Bottles and Carboys (% of total pkg for this industry)
FOOD INDUSTRIES	19.5	24.4	9.1	< 0.1	16.3
BEVERAGE INDUSTRIES	3.9	17.5	16.0	0	48.7
TOBACCO PRODUCT INDUSTRIES	79.3	8.2	3.4	0	NA
PLASTIC PRODUCTS INDUSTRY	19.7	44.3	0.0	0.9	0
PAPER AND ALLIED PRODUCTS INDUSTRIES	15.2	24.7	N/A	0	0
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	8.4	11.4	0.0	0	0
FABRICATED METAL INDUSTRIES	8.7	24.3	N/A	0	0
TRANSPORTATION EQUIPMENT INDUSTRIES	8.7	32.4	0.0	1.8	0
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	9.4	42.1	N/A	NA	0
NON-METALIC MINERAL PRODUCTS INDUSTRIES	< 0.1	39.7	< 0.1	NA	0
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	15.4	19.9	8.5	2.8	11
OTHER MANUFACTURING INDUSTRIES	14.9	27.2	0.3	43.3	NA

Notes: 'NA' .. Data was not available, Statistics Canada Confidentiality Acts
: These 12 Industry Sectors use an estimated 91.4 percent of packaging in Canada in 1988
: Imports of packaging in use is not included

TABLE 4.3 (con't)

PERCENTAGE OF TOTAL PACKAGING USE BY INDUSTRY SECTORS
(1988)

INDUSTRY SECTOR	Wrapping Pa er Products (% of total pkg for this industry)	Wood (% of total pkg for this industry)	Plastics (% of total pkg for this industry)	Transparent Film (% of total pkg for this industry)	Foil/Labels Tags/Wrappers (% of total pkg for this industry)
FOOD INDUSTRIES	8.2	0.6	8.7	12.6	0.1
BEVERAGE INDUSTRIES	NA	1	12.1	<0.1	0.6
TOBACCO PRODUCT INDUSTRIES	NA	0	4.2	2.7	2.1
PLASTIC PRODUCTS INDUSTRY	5.8	18.9	3	7.4	< 0.1
PAPER AND ALLIED PRODUCTS INDUSTRIES	26.7	19.8	7.7	5.7	< 0.1
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	4.8	68.7	4.7	1.8	< 0.1
FABRICATED METAL INDUSTRIES	1.4	57.8	5.8	0.4	< 0.1
TRANSPORTATION EQUIPMENT INDUSTRIES	NA	53.2	4	1.7	< 0.1
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	2.6	37.8	7.1	0.5	0.4
NON-METALIC MINERAL PRODUCTS INDUSTRIES	10	40.1	3.8	5.9	< 0.1
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	2.8	19.6	17.1	2.1	0.8
OTHER MANUFACTURING INDUSTRIES	8.9	2.1	1.8	1.2	< 0.1

Notes: 'NA' .. Data was not available, Statistics Canada Confidentiality Acts
: These 12 Industry Sectors use an estimated 91.4 percent of packaging in Canada in 1988
: Imports of packaging in use is not included

The central feature of the data included in Table 4.3 is the dominance (in terms of tonnage) of one or two packaging materials for most industry sectors. Among non-consumer industry sectors, wood holds a dominant position. Thus, wood comprises at least half the tonnage of packaging used by each of printing and publishing, primary metal, fabricated metal, machinery and transportation equipment sectors; between one-third and one half of the tonnage of packaging used by the electrical/electronic products and non-metallic mineral products sectors is also wood packaging.

The dominance of wood packaging in these industry sectors can be contrasted with the use of wood in the food and beverage sectors, where data in Table 4.3 indicate it is of only incidental importance. This reflects the distribution between expenditures on wood packaging and application of wood packaging. Discussions with the wood packaging industry indicate that 40 percent of wood packaging is used by grocery and consumer products industries. Wood packaging in these sectors is dominated by reusable wood pallets, therefore annual expenditures on new wood pallets are relatively minor. Among other sectors, however, the use of "one-way" pallets dominates, and consequently annual expenditures on wood packaging is high.

Unlike wood packaging, the use of corrugated boxes and cartons does not generally dominate specific industry sectors as a proportion of total tonnage of packaging used, but is a major proportion of packaging used by a wider range of sectors than wood. Among those sectors where wood is the dominant package in terms of tonnage, corrugated boxes and cartons generally rank second in importance. Although corrugated boxes and cartons tend not to dominate specific industry sectors, they rank first in importance in terms of tonnage used in the food industry, where they comprise a quarter of packaging used.

Folding and set-up boxes are also used by a wide variety of industries, but are typically a relatively small proportion of the tonnage of packaging used by each industry sector. The principal exception to this is the tobacco products sector, where they comprised almost 80 percent of the estimated tonnage of packaging used by that industry in 1988.

The use of plastics for packaging does not dominate in any of the industry sectors identified in Table 4.3. However, plastics (rigid and film combined) comprise at least 5 percent by weight of the packaging used by eleven of the twelve sectors considered, and comprise up to approximately 20 percent of the packaging used by two of these sectors: food industries and chemical and chemical products. In the food industries sector, plastics are estimated to be the second most important packaging material by weight after corrugated boxes and cartons; in the chemical and chemical products sector they rank equal with corrugated boxes and cartons.

Remaining packaging materials tend to be used either by a smaller range of industry sectors, or as a minor proportion of the packaging used by industry sectors. Glass is used by only three industry sectors, but is estimated to comprise almost half the packaging weight of one of these, the beverage industry.

Likewise, metal cans and barrels/drums tend not to be dominant packaging types in any sector, although metal cans are significant in three sectors. Notably, barrels and drums are a major proportion of the tonnage of packaging used by "other manufacturing industries", probably because of the use of drums for the packaging of raw materials and liquid wastes.

Finally, foil/labels/tags/wrappers are a very minor component of the packaging used by all industry sectors. In the tobacco products sector they are estimated at 2 percent of packaging used, and in the chemical and chemical products sector (which includes the pharmaceuticals and toiletries industries) they approach 1 percent of packaging used.

Although the tonnage of packaging used in sectors other than those included in Table 4.3 represents less than 10 percent of the packaging used in Canada, one or two packaging material types dominate the packaging used by each of the remaining industry sectors. The

packaging materials that comprise at least 20 percent of the packaging used by each of the remaining industry sectors is identified below, with the estimated percentage in brackets:

Rubber Products:	corrugated boxes/cartons (36.5 percent) and wood (33.3 percent)
Leather and Allied Products:	folding and set-up boxes (32.3 percent) and corrugated boxes/cartons (63.4 percent)
Primary Textiles:	corrugated boxes/cartons (50.7 percent)
Textile Products:	folding and set-up boxes (28.1 percent) and corrugated boxes/cartons (44.3 percent)
Clothing Industry:	folding and set-up boxes (20.0 percent), corrugated boxes and cartons (29.7 percent) and wrapping paper (34.6 percent)
Wood Industry:	plastics (48.0 percent)
Furniture Industry:	folding and set-up boxes (25.0 percent) and corrugated boxes and cartons (57.1 percent)
Primary Metal Industry:	wood (73.4 percent)
Machinery Industry:	wood (67.8 percent)
Refined Petroleum and Coal:	corrugated boxes and cartons (20.4 percent) and plastics (70.1 percent)

The major types of packaging used by those sectors identified above amounted to an estimated 239,000 tonnes in 1988, or 4.3 percent of all packaging estimated to have been

used in Canada in that year. These data and the data in Table 4.3 identify estimated packaging use by industry sector for 96 percent of estimated packaging purchased by Canadian industry in 1988.

Data in Table 4.3 and Appendix C and Appendix D allow a preliminary estimate to be made regarding the proportion of packaging that is industrial/commercial packaging and the proportion that is consumer packaging. Food, beverage and tobacco product sectors are consumer-oriented industries; however, the corrugated boxes/cartons, barrels and drums and wood packaging used by these sectors is used for product transportation and is not consumer packaging. Within the chemical and chemical product sector, which includes pharmaceuticals and toiletries, glass bottles and carboys are used as consumer-oriented packaging, but other packaging is primarily industrial/commercial in nature. Packaging used by other sectors is largely industrial/commercial.

On the basis of these assumptions, it is estimated that at least 40 percent of packaging used in Canada in 1988 was consumer packaging, and that no more than 60 percent was industrial/commercial packaging.

This estimate under-estimates the actual amount of consumer packaging used and overstates the amount of industrial/commercial packaging used because it does not take account of the relatively small, but unknown tonnage of consumer packaging used by industry sectors other than those identified above. In spite of this uncertainty, currently available data indicates that industrial/commercial packaging comprises a greater tonnage of material than consumer packaging.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1) Total packaging expenditures by Canadian industry as a proportion of product value have remained relatively constant in the 1979 to 1986 period at approximately 3.5 percent of total material cost.

2) Using data collected by Statistics Canada over the 1979 to 1986 period it is possible to identify the expenditures of industry sectors on packaging. For most industry sectors, 80 percent of packaging expenditures are made on four or fewer types of packaging.

3) Also based on these data, together with data on packaging production available from industry, it is possible to estimate the amount and type of packaging used by industry sectors in 1988.

4) Reflecting overall expenditures on packaging, each industry sector typically utilizes relatively few packaging materials to meet a large majority of its packaging requirements.

5) There is a high level of concentration of the use of packaging in Canada. The five industry sectors who used the largest amounts of packaging in 1988 accounted for an estimated 72 percent of all packaging used in Canada in that year; over 90 percent of packaging was used by twelve industry sectors.

6) An estimated 60 percent of packaging used in Canada in 1988 was industrial/commercial packaging. The remaining 40 percent is estimated to be consumer packaging.

Recommendations

1) Action taken through the National Packaging Protocol to divert packaging from disposal should focus on specific industry sectors and the principal types of packaging they use.

2) Although different industry sectors may use similar packaging materials, different strategies will be required according to industry sector in order to achieve diversions from disposal. This is the case because of the different applications to which similar packaging materials may be put in different sectors, and the different regulatory, consumer demand and other factors that affect the application of packaging.

3) In light of the dominance of the food and beverage sectors in packaging use, they must be central in strategies to achieve overall diversions of packaging from disposal. Constraints on the source reduction and reuse of this packaging are significant, however.

4) Progress towards achieving packaging diversion targets may be most rapidly achieved in the short-term by addressing industrial packaging such as wood packaging and corrugated cartons/boxes. These packaging types are widely used by industry in Canada. These packaging types have high potential for reuse and recycling, although realizing the opportunities available will require changes in the structure of the industries supplying the packaging and the development of infrastructures to ensure the diversion of this packaging from disposal.

5) The collection of the data that permitted the analyses in this report is not currently being undertaken. Environment Canada should discuss the re-introduction of the collection of this data with Statistics Canada and relevant industry associations as part of the overall data collection effort necessary to

support the National Packaging Protocol.

APPENDIX A

APPENDIX A

Annual Gross Expenditures
By Industry Sectors
On Packaging Types 1979 - 1986

Data in this Appendix identify the expenditures of each industry sector on each packaging type during the 1979 - 1986 period.

In this Appendix, the symbol "x" indicates that data is not available through protection of confidentiality under the Statistics Canada Confidentiality Act. The symbol " - " indicates no expenditures were made by an industry sector on a packaging type, except where the symbol is used in conjunction with the beverage industry and the plastic products industry. In these cases, the symbol " - " indicates that data on beverage industry expenditures is included within the food industry, and that plastic products industry expenditures are included within the rubber products industry.

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

FOLDING AND SET-UP BOXES, PAPERBOARD

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	207,515	263,753	309,328	303,911	286,636	292,398	301,573	311,929
BEVERAGE INDUSTRIES	-	-	-	-	25,819	35,186	45,724	36,447
TOBACCO PRODUCTS INDUSTRIES	53,170	58,005	69,203	73,607	71,236	72,791	76,936	75,365
RUBBER PRODUCTS INDUSTRIES	5,540	8,458	9,672	8,607	1,875	2,234	1,747	1,617
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	9,630	11,789	12,822	15,704
LEATHER AND ALLIED INDUSTRIES	5,053	4,603	7,507	6,281	7,071	7,259	6,286	6,332
PRIMARY TEXTILE INDUSTRIES	4,733	8,004	9,740	9,995	1,558	1,495	1,302	1,710
TEXTILE PRODUCTS INDUSTRIES	2,635	3,247	3,665	3,484	8,113	9,670	9,520	9,899
CLOTHING INDUSTRIES	5,276	5,768	6,055	5,423	9,983	10,611	9,844	9,690
WOOD INDUSTRIES	707	876	1,145	761	834	749	982	900
FURNITURE AND FIXTURE INDUSTRIES	4,349	6,996	8,990	9,857	7,190	11,569	13,041	13,450
PAPER AND ALLIED PRODUCTS INDUSTRIES	19,227	35,539	38,356	44,336	44,430	43,932	49,088	47,465
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	6,099	6,883	7,850	7,290	8,351	9,223	9,551	11,742
PRIMARY METAL INDUSTRIES	242	416	555	451	427	451	405	x
FABRICATED METAL PRODUCTS INDUSTRIES	7,138	7,303	7,968	7,208	8,767	7,382	10,543	12,548
MACHINERY INDUSTRIES	2,908	4,913	3,329	2,867	2,544	3,588	2,452	3,086
TRANSPORTATION EQUIPMENT INDUSTRIES	8,939	7,675	8,176	7,757	10,689	14,685	14,221	15,361
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	8,904	14,062	14,868	13,487	18,927	16,805	16,572	15,661
NON-METALIC MINERAL PRODUCTS INDUSTRIES	610	742	950	880	966	764	x	x
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	1,892	-	-	-	-	-	-	-
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	29,595	34,483	45,089	46,063	57,881	65,206	68,929	67,768
OTHER MANUFACTURING INDUSTRIES	10,274	9,939	10,449	12,448	13,263	16,116	13,890	15,847
TOTAL EXPENDITURES	314,806	494,563	562,875	561,756	596,190	633,903	665,928	673,593

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

CANS (metal)

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	468,626	530,350	592,264	621,734	420,156	438,870	461,022	420,498
BEVERAGE INDUSTRIES	-	-	-	-	236,263	275,184	x	357,357
TOBACCO PRODUCTS INDUSTRIES	4,566	4,514	4,321	5,657	5,768	5,864	6,308	7,902
RUBBER PRODUCTS INDUSTRIES	1,004	786	593	548	601	1,121	1,100	1,617
PLASTIC PRODUCTS INDUSTRIES	-		-	-	-	-	-	-
LEATHER AND ALLIED INDUSTRIES	-	-	-	-	-	-	-	-
PRIMARY TEXTILE INDUSTRIES	x	-	-	-	-	-	-	-
TEXTILE PRODUCTS INDUSTRIES	-	-	-	-	-	-	-	-
CLOTHING INDUSTRIES	-	-	-	-	-	-	-	-
WOOD INDUSTRIES	x	x	x	x	x	x	-	-
FURNITURE AND FIXTURE INDUSTRIES	-	-	-	-	-	-	-	-
PAPER AND ALLIED PRODUCTS INDUSTRIES	x	x	x	x	x	461	331	x
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	-	-	-	-	-	-	-	-
PRIMARY METAL INDUSTRIES	187	189	321	273	305	x	103	x
FABRICATED METAL PRODUCTS INDUSTRIES	x	x	x	x	x	453	301	x
MACHINERY INDUSTRIES	-	-	-	-	-	-	-	-
TRANSPORTATION EQUIPMENT INDUSTRIES	-	-	-	-	-	-	-	-
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	x	x	x	x	x	x	x	x
NON-METALIC MINERAL PRODUCTS INDUSTRIES	1,136	810	522	467	525	533	461	440
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	11,387	17,844	19,307	16,566	9,001	6,749	4,495	4,618
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	72,070	84,737	82,078	42,476	43,546	92,760	113,405	116,900
OTHER MANUFACTURING INDUSTRIES	2,378	2,564	2,242	2,350	2,467	490	335	236
TOTAL EXPENDITURES	562,057	642,513	702,493	690,961	719,523	822,671	916,962	910,525

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

GLASS BOTTLES, JARS AND CARBOYS

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	262,514	278,931	322,310	346,951	129,118	139,376	137,457	146,788
BEVERAGE INDUSTRIES	-	-	-	-	232,196	211,918	228,368	252,399
TOBACCO PRODUCTS INDUSTRIES	-	-	-	-	-	-	x	x
RUBBER PRODUCTS INDUSTRIES	x	-	-	-	-	-	-	-
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	-	-	-	-
LEATHER AND ALLIED INDUSTRIES	-	-	-	-	-	-	-	-
PRIMARY TEXTILE INDUSTRIES	x	-	-	-	-	-	-	-
TEXTILE PRODUCTS INDUSTRIES	-	-	-	-	-	-	-	-
CLOTHING INDUSTRIES	-	-	-	-	-	-	-	-
WOOD INDUSTRIES	-	-	-	-	-	-	-	-
FURNITURE AND FIXTURE INDUSTRIES	-	-	-	-	-	-	-	-
PAPER AND ALLIED PRODUCTS INDUSTRIES	-	-	-	-	-	-	-	-
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	-	-	-	-	-	-	-	-
PRIMARY METAL INDUSTRIES	-	-	-	-	-	-	-	x
FABRICATED METAL PRODUCTS INDUSTRIES	-	-	-	-	-	-	x	-
MACHINERY INDUSTRIES	-	-	-	-	-	-	-	-
TRANSPORTATION EQUIPMENT INDUSTRIES	-	-	-	-	-	-	-	-
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	-	-	-	x	-	x	-	-
NON-METALIC MINERAL PRODUCTS INDUSTRIES	x	-	-	-	-	-	-	-
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	-	-	-	-	-	-	-	-
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	33,106	37,490	36,983	38,953	38,052	42,719	46,449	35,206
OTHER MANUFACTURING INDUSTRIES	24	39	x	x	-	x	x	x
TOTAL EXPENDITURES	296,695	316,460	359,322	385,948	399,376	394,102	412,426	434,568

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

PAPER AND PAPERBOARD

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	43,030	38,279	41,289	43,033	39,936	46,792	41,569	45,557
BEVERAGE INDUSTRIES	-	-	-	-	x	x	x	x
TOBACCO PRODUCTS INDUSTRIES	-	-	-	-	-	x	5,827	x
RUBBER PRODUCTS INDUSTRIES	2,058	2,086	2,096	2,296	2,275	2,831	x	2,096
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	1,674	2,734	x	3,448
LEATHER AND ALLIED INDUSTRIES	343	402	626	624	568	608	x	369
PRIMARY TEXTILE INDUSTRIES	6,767	4,508	4,766	4,468	2,240	2,207	x	1,456
TEXTILE PRODUCTS INDUSTRIES	2,776	3,150	4,296	2,943	3,561	3,595	3,531	x
CLOTHING INDUSTRIES	2,688	2,697	3,324	3,302	6,239	6,327	7,887	9,698
WOOD INDUSTRIES	9,173	8,926	10,357	10,123	14,308	14,721	13,529	12,107
FURNITURE AND FIXTURE INDUSTRIES	4,188	4,754	5,552	4,655	4,555	4,816	x	4,854
PAPER AND ALLIED PRODUCTS INDUSTRIES	3,984	4,577	5,194	5,424	4,991	66,344	69,733	80,815
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	2,941	3,778	4,028	5,255	4,111	5,341	x	5,512
PRIMARY METAL INDUSTRIES	1,212	1,652	x	1,497	1,823	1,938	1,595	28
FABRICATED METAL PRODUCTS INDUSTRIES	3,874	3,051	2,219	2,001	2,942	2,372	1,498	1,543
MACHINERY INDUSTRIES	580	573	650	496	255	220	x	x
TRANSPORTATION EQUIPMENT INDUSTRIES	x	x	x	x	x	x	452	1,043
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	2,266	1,692	1,672	1,299	1,707	3,258	x	x
NON-METALIC MINERAL PRODUCTS INDUSTRIES	2,578	3,492	4,876	4,980	6,015	6,485	7,396	5,634
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	x	x	x	x	x	x	19	x
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	3,076	1,051	1,851	3,728	4,959	7,009	7,109	1,768
OTHER MANUFACTURING INDUSTRIES	732	7,623	5,454	5,948	7,675	9,648	9,708	8,835
TOTAL EXPENDITURE	94,377	92,301	100,131	102,207	109,885	189,105	191,532	200,742

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

METAL/PLASTIC (CLOSURES,STAPLES,STRAPPING,WIRE)

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	90,759	90,609	104,933	120,359	62,442	64,481	69,999	84,277
BEVERAGE INDUSTRIES	-	-	-	-	87,741	97,357	108,400	113,994
TOBACCO PRODUCTS INDUSTRIES	0	0	0	0	0	343	166	0
RUBBER PRODUCTS INDUSTRIES	358	1,121	1,023	2,758	329	480	584	730
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	4,822	5,937	5,197	6,245
LEATHER AND ALLIED INDUSTRIES	0	0	0	36	72	94	0	0
PRIMARY TEXTILE INDUSTRIES	1,843	2,910	2,813	2,397	402	570	905	0
TEXTILE PRODUCTS INDUSTRIES	0	0	0	40	799	789	2,429	1,773
CLOTHING INDUSTRIES	230	147	177	173	120	283	448	393
WOOD INDUSTRIES	2,260	24,862	27,048	25,949	34,158	36,684	43,718	47,614
FURNITURE AND FIXTURE INDUSTRIES	58	132	174	166	100	832	894	635
PAPER AND ALLIED PRODUCTS INDUSTRIES	21,708	25,268	26,276	24,354	35,004	48,349	47,151	46,351
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	57	0	103	116	297	1,970	402	1,652
PRIMARY METAL INDUSTRIES	8,871	11,020	12,138	11,687	14,236	21,112	8,987	10,885
FABRICATED METAL PRODUCTS INDUSTRIES	5,603	5,920	7,369	4,279	5,797	11,240	8,451	12,493
MACHINERY INDUSTRIES	964	1,371	1,677	4,265	2,117	2,315	2,755	2,936
TRANSPORTATION EQUIPMENT INDUSTRIES	740	669	685	8,406	6,246	10,159	9,115	12,249
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	2,541	6,034	7,949	9,642	8,244	11,517	11,710	12,167
NON-METALIC MINERAL PRODUCTS INDUSTRIES	2,822	4,876	4,676	5,279	7,382	8,544	5,734	9,565
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	0	0	0	210	5,343	7,695	5,000	5,916
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	18,465	23,671	38,926	38,007	42,155	39,390	50,632	78,244
OTHER MANUFACTURING INDUSTRIES	137	993	1,048	1,091	1,165	1,502	1,324	1,152
TOTAL EXPENDITURES	167,880	200,305	237,974	259,612	319,828	372,433	407,486	449,437

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

TRANSPARENT FILM (BAGS,SHEETS,ROLLS)

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	151,376	185,606	214,092	205,342	218,008	246,167	244,284	272,410
BEVERAGE INDUSTRIES	-	-	-	-	1,504	1,360	804	1,145
TOBACCO PRODUCTS INDUSTRIES	8,071	8,805	10,175	10,413	9,480	9,735	9,977	4,702
RUBBER PRODUCTS INDUSTRIES	4,571	4,606	6,712	6,328	0	425	536	0
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	7,634	8,471	8,894	9,854
LEATHER AND ALLIED INDUSTRIES	90	114	151	195	212	325	262	110
PRIMARY TEXTILE INDUSTRIES	5,380	5,527	7,278	5,286	1,047	1,203	2,181	2,555
TEXTILE PRODUCTS INDUSTRIES	2,965	3,143	4,027	3,299	5,590	5,643	6,663	8,833
CLOTHING INDUSTRIES	2,585	3,272	2,950	2,832	5,985	6,355	6,364	7,174
WOOD INDUSTRIES	2,144	3,752	4,682	5,473	5,696	7,276	129	9,399
FURNITURE AND FIXTURE INDUSTRIES	2,105	2,231	2,996	2,359	2,685	3,152	3,149	4,867
PAPER AND ALLIED PRODUCTS INDUSTRIES	6,076	7,949	10,569	10,112	8,485	10,081	14,446	20,819
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	185	160	421	945	1,077	1,321	1,231	1,455
PRIMARY METAL INDUSTRIES	18	413	104	117	0	106	96	2,029
FABRICATED METAL PRODUCTS INDUSTRIES	254	233	176	275	268	845	1,073	717
MACHINERY INDUSTRIES	0	0	0	0	0	0	0	0
TRANSPORTATION EQUIPMENT INDUSTRIES	638	505	483	463	1,573	1,767	1,515	2,565
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	247	373	264	352	560	476	537	902
NON-METALIC MINERAL PRODUCTS INDUSTRIES	6,009	8,515	9,940	8,296	11,364	12,992	14,958	14,504
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	0	0	0	50	0	0	0	0
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	11,522	13,517	18,205	20,882	22,024	24,797	29,477	15,884
OTHER MANUFACTURING INDUSTRIES	1,772	1,849	2,634	2,544	3,352	3,013	2,317	2,072
TOTAL EXPENDITURES	206,698	251,341	296,398	285,660	308,181	346,635	358,806	394,610

GROSS EXPENDITURES BY YEAR FOR PACKAGING TYPE

MISCELLANEOUS (PAPER DRUMS AND CANS, CORES, CONES, ETC.)

MAJOR GROUP	1979 ($'000)	1980 ($'000)	1981 ($'000)	1982 ($'000)	1983 ($'000)	1984 ($'000)	1985 ($'000)	1986 ($'000)
FOOD INDUSTRIES	61,045	70,015	78,720	84,871	67,051	73,994	87,217	109,439
BEVERAGE INDUSTRIES	-	-	-	-	17,705	15,849	51,307	67,970
TOBACCO PRODUCTS INDUSTRIES	2,818	3,788	4,506	4,479	4,499	0	968	1,451
RUBBER PRODUCTS INDUSTRIES	4,483	4,122	3,427	3,159	2,237	1,356	2,417	3,039
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	3,448	2,378	3,280	4,388
LEATHER AND ALLIED INDUSTRIES	1,047	154	301	140	91	0	325	1,080
PRIMARY TEXTILE INDUSTRIES	5,554	17,454	20,192	16,892	14,898	13,533	607	483
TEXTILE PRODUCTS INDUSTRIES	1,150	1,476	1,716	1,425	5,075	4,157	2,678	4,481
CLOTHING INDUSTRIES	2,580	2,853	3,259	3,999	5,011	4,818	5,117	6,697
WOOD INDUSTRIES	6,329	9,047	9,361	9,599	12,101	13,547	14,952	1,541
FURNITURE AND FIXTURE INDUSTRIES	3,285	2,796	3,373	2,160	2,449	910	426	520
PAPER AND ALLIED PRODUCTS INDUSTRIES	40,782	42,470	45,469	46,208	43,465	37,934	40,343	47,284
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	3,714	4,471	4,881	4,886	5,486	3,373	4,505	4,518
PRIMARY METAL INDUSTRIES	6,666	6,670	6,006	6,946	5,510	1,695	1,016	702
FABRICATED METAL PRODUCTS INDUSTRIES	11,884	7,711	11,216	15,240	12,523	6,985	6,719	7,152
MACHINERY INDUSTRIES	3,434	5,264	4,589	1,867	1,325	881	780	361
TRANSPORTATION EQUIPMENT INDUSTRIES	6,239	5,932	6,384	2,393	3,479	2,101	1,282	716
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	11,162	11,795	12,792	11,161	11,357	15,221	13,414	13,644
NON-METALIC MINERAL PRODUCTS INDUSTRIES	3,562	3,506	2,792	2,523	2,272	2,009	1,859	2,549
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	12,108	15,447	14,992	11,009	10,742	4,049	3,714	1,640
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	85,451	87,076	81,159	113,700	126,901	78,079	68,245	51,003
OTHER MANUFACTURING INDUSTRIES	2,779	2,285	134	148	3,608	3,826	1,246	1,521
TOTAL EXPENDITURES	285,882	310,085	319,226	346,736	371,882	294,336	340,345	391,719

APPENDIX B

Proportional Annual Expenditures By Industry Sectors On Packaging Types 1979 - 1986

Data in this Appendix identify for each packaging type the proportion of annual expenditures accounted for by each sector during the 1979 - 1986 period.

In this Appendix, the symbol " - " against the beverage industry sector indicates data are included within the food industry sector. Against the plastics products sector, the symbol " - " indicates data is included within the rubber products sector.

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

FOLDING AND SET-UP BOXES, PAPERBOARD

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	53.9%	53.3%	55.0%	54.1%	48.1%	46.1%	45.3%	46.3%
BEVERAGE INDUSTRIES	-	-	-	-	4.3%	5.6%	6.9%	5.4%
TOBACCO PRODUCTS INDUSTRIES	13.8%	11.7%	12.3%	13.1%	11.9%	11.5%	11.6%	11.2%
RUBBER PRODUCTS INDUSTRIES	1.4%	1.7%	1.7%	1.5%	0.3%	0.4%	0.3%	0.2%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	1.6%	1.9%	1.9%	2.3%
LEATHER AND ALLIED INDUSTRIES	1.3%	0.9%	1.3%	1.1%	1.2%	1.1%	0.9%	0.9%
PRIMARY TEXTILE INDUSTRIES	1.2%	1.6%	1.7%	1.8%	0.3%	0.2%	0.2%	0.3%
TEXTILE PRODUCTS INDUSTRIES	0.7%	0.7%	0.7%	0.6%	1.4%	1.5%	1.4%	1.5%
CLOTHING INDUSTRIES	1.4%	1.2%	1.1%	1.0%	1.7%	1.7%	1.5%	1.4%
WOOD INDUSTRIES	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
FURNITURE AND FIXTURE INDUSTRIES	1.1%	1.4%	1.6%	1.8%	1.2%	1.8%	2.0%	2.0%
PAPER AND ALLIED PRODUCTS INDUSTRIES	5.0%	7.2%	6.8%	7.9%	7.5%	6.9%	7.4%	7.0%
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	1.6%	1.4%	1.4%	1.3%	1.4%	1.5%	1.4%	1.7%
PRIMARY METAL INDUSTRIES	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	na
FABRICATED METAL PRODUCTS INDUSTRIES	1.9%	1.5%	1.4%	1.3%	1.5%	1.2%	1.6%	1.9%
MACHINERY INDUSTRIES	0.8%	1.0%	0.6%	0.5%	0.4%	0.6%	0.4%	0.5%
TRANSPORTATION EQUIPMENT INDUSTRIES	2.3%	1.6%	1.5%	1.4%	1.8%	2.3%	2.1%	2.3%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	2.3%	2.8%	2.6%	2.4%	3.2%	2.7%	2.5%	2.3%
NON-METALIC MINERAL PRODUCTS INDUSTRIES	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	na	na
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	7.7%	7.0%	8.0%	8.2%	9.7%	10.3%	10.4%	10.1%
OTHER MANUFACTURING INDUSTRIES	2.7%	2.0%	1.9%	2.2%	2.2%	2.5%	2.1%	2.4%
TOTAL	100.0%	97.4%	100.0%	100.5%	100.0%	100.0%	99.9%	99.8%
$ VALUE	384,806	494,563	562,875	561,756	596,190	633,903	665,928	673,593

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

CANS (metal)

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	83.4%	82.5%	84.3%	90.0%	58.4%	53.3%	50.3%	46.2%
BEVERAGE INDUSTRIES	-	-	-	-	32.8%	33.5%	na	39.2%
TOBACCO PRODUCTS INDUSTRIES	0.8%	0.7%	0.6%	0.8%	0.8%	0.7%	0.7%	0.9%
RUBBER PRODUCTS INDUSTRIES	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	0.0%	0.0%	0.0%	0.0%
LEATHER AND ALLIED INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PRIMARY TEXTILE INDUSTRIES	na	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TEXTILE PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CLOTHING INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
WOOD INDUSTRIES	na	na	na	na	na	na	0.0%	0.0%
FURNITURE AND FIXTURE INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PAPER AND ALLIED PRODUCTS INDUSTRIES	na	na	na	na	na	0.1%	0.0%	na
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PRIMARY METAL INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	na	0.0%	na
FABRICATED METAL PRODUCTS INDUSTRIES	na	na	na	na	na	0.1%	0.0%	na
MACHINERY INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TRANSPORTATION EQUIPMENT INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	na	0.0%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	na	na	na	na	na	na	na	na
NON-METALIC MINERAL PRODUCTS INDUSTRIES	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	2.0%	2.8%	2.7%	2.4%	1.3%	0.8%	0.5%	0.5%
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	12.8%	13.2%	11.7%	6.1%	6.1%	11.3%	12.4%	12.8%
OTHER MANUFACTURING INDUSTRIES	0.4%	0.4%	0.3%	0.3%	0.3%	0.1%	0.0%	0.0%
TOTAL	99.9%	99.9%	99.9%	99.9%	99.9%	100.0%	64.1%	99.9%
$ VALUE	562,057	642,513	702,493	690,961	719,523	822,671	916,962	910,525

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

GLASS BOTTLES, JARS AND CARBOYS

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	88.5%	88.1%	89.7%	89.9%	32.3%	35.4%	33.3%	33.8%
BEVERAGE INDUSTRIES	-	-	-	-	58.1%	53.8%	55.4%	58.1%
TOBACCO PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	na	na
RUBBER PRODUCTS INDUSTRIES	na	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	0.0%	0.0%	0.0%	0.0%
LEATHER AND ALLIED INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PRIMARY TEXTILE INDUSTRIES	na	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TEXTILE PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CLOTHING INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
WOOD INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FURNITURE AND FIXTURE INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PAPER AND ALLIED PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PRIMARY METAL INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	na
FABRICATED METAL PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	na	0.0%
MACHINERY INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TRANSPORTATION EQUIPMENT INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	na	0.0%	na	0.0%	0.0%
NON-METALIC MINERAL PRODUCTS INDUSTRIES	na	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	11.2%	11.8%	10.3%	10.1%	9.5%	10.8%	11.3%	8.1%
OTHER MANUFACTURING INDUSTRIES	0.0%	0.0%	na	na	0.0%	na	na	na
TOTAL	99.6%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
$ VALUE	296,695	316,460	359,322	385,948	399,376	394,102	412,426	434,568

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

PAPER AND PAPERBOARD

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	45.6%	41.5%	41.2%	42.1%	36.3%	24.7%	21.7%	22.7%
BEVERAGE INDUSTRIES	-	-	-	-	na	na	na	na
TOBACCO PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	na	3.0%	na
RUBBER PRODUCTS INDUSTRIES	2.2%	2.3%	2.1%	2.2%	2.1%	1.5%	na	1.0%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	1.5%	1.4%	na	1.7%
LEATHER AND ALLIED INDUSTRIES	0.4%	0.4%	0.6%	0.6%	0.5%	0.3%	na	0.2%
PRIMARY TEXTILE INDUSTRIES	7.2%	4.9%	4.8%	4.4%	2.0%	1.2%	na	0.7%
TEXTILE PRODUCTS INDUSTRIES	2.9%	3.4%	4.3%	2.9%	3.2%	1.9%	1.8%	na
CLOTHING INDUSTRIES	2.8%	2.9%	3.3%	3.2%	5.7%	3.3%	4.1%	4.6%
WOOD INDUSTRIES	9.7%	9.7%	10.3%	9.9%	13.0%	7.8%	7.1%	6.0%
FURNITURE AND FIXTURE INDUSTRIES	4.4%	5.2%	5.5%	4.6%	4.1%	2.5%	na	2.4%
PAPER AND ALLIED PRODUCTS INDUSTRIES	4.2%	5.0%	5.2%	5.3%	4.5%	35.1%	36.4%	40.3%
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	3.1%	4.1%	4.0%	5.1%	3.7%	2.8%	na	2.7%
PRIMARY METAL INDUSTRIES	1.3%	1.8%	na	1.5%	1.7%	1.0%	0.8%	0.0%
FABRICATED METAL PRODUCTS INDUSTRIES	4.1%	3.3%	2.2%	2.0%	2.7%	1.3%	0.8%	0.8%
MACHINERY INDUSTRIES	0.6%	0.6%	0.6%	0.5%	0.2%	0.1%	na	na
TRANSPORTATION EQUIPMENT INDUSTRIES	na	na	na	na	na	na	0.2%	0.5%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	2.4%	1.8%	1.7%	1.3%	1.6%	1.7%	na	na
NON-METALIC MINERAL PRODUCTS INDUSTRIES	2.7%	3.8%	4.9%	4.9%	5.5%	3.4%	3.9%	2.8%
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	na	na	na	na	na	na	0.0%	na
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	3.3%	1.1%	1.8%	3.6%	4.5%	3.7%	3.7%	0.9%
OTHER MANUFACTURING INDUSTRIES	0.8%	8.3%	5.4%	5.8%	7.0%	5.1%	5.1%	4.4%
TOTAL	97.8%	100.0%	98.1%	99.9%	100.0%	99.0%	88.7%	92.0%
$ VALUE	94,377	92,301	100,131	102,207	109,885	189,105	191,532	200,742

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

METAL/PLASTIC (CLOSURES,STAPLES,STRAPPING,WIRE)

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	48.1%	45.2%	44.1%	46.4%	19.5%	17.3%	17.2%	14.3%
BEVERAGE INDUSTRIES	-	-	-	-	27.4%	26.1%	26.6%	25.4%
TOBACCO PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
RUBBER PRODUCTS INDUSTRIES	0.2%	0.6%	0.4%	1.1%	0.1%	0.1%	0.1%	0.2%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	1.5%	1.6%	1.3%	1.4%
LEATHER AND ALLIED INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PRIMARY TEXTILE INDUSTRIES	1.1%	1.5%	1.2%	0.9%	0.1%	0.2%	0.2%	0.0%
TEXTILE PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.6%	0.4%
CLOTHING INDUSTRIES	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%
WOOD INDUSTRIES	1.3%	12.4%	11.4%	10.0%	10.7%	9.8%	10.7%	10.6%
FURNITURE AND FIXTURE INDUSTRIES	0.0%	0.1%	0.1%	0.1%	0.0%	0.2%	0.2%	0.1%
PAPER AND ALLIED PRODUCTS INDUSTRIES	12.9%	12.6%	11.0%	9.4%	10.9%	13.0%	11.6%	10.3%
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	0.1%	0.4%
PRIMARY METAL INDUSTRIES	5.3%	5.5%	5.1%	4.5%	4.5%	5.7%	2.2%	2.4%
FABRICATED METAL PRODUCTS INDUSTRIES	3.3%	3.0%	3.1%	1.6%	1.8%	3.0%	2.1%	2.8%
MACHINERY INDUSTRIES	0.6%	0.7%	0.7%	1.6%	0.7%	0.6%	0.7%	0.7%
TRANSPORTATION EQUIPMENT INDUSTRIES	0.4%	0.3%	0.3%	3.2%	2.0%	2.7%	2.2%	2.7%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	1.5%	3.0%	3.3%	3.7%	2.6%	3.1%	2.9%	2.7%
NON-METALIC MINERAL PRODUCTS INDUSTRIES	1.7%	2.4%	2.0%	2.0%	2.3%	2.3%	1.4%	2.1%
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.1%	1.7%	2.1%	1.2%	1.3%
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	11.0%	11.8%	16.4%	14.6%	13.2%	10.6%	12.4%	17.4%
OTHER MANUFACTURING INDUSTRIES	0.1%	0.5%	0.4%	0.4%	0.4%	0.4%	0.3%	0.3%
TOTAL	87.8%	99.6%	99.6%	99.8%	99.7%	99.6%	94.2%	95.5%
$ VALUE	167,880	200,305	237,974	259,612	319,828	372,433	407,486	449,437

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

TRANSPARENT FILM (BAGS,SHEETS,ROLLS)

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	73.2%	73.8%	72.2%	71.9%	70.7%	71.0%	68.1%	69.0%
BEVERAGE INDUSTRIES	-	-	-	-	0.5%	0.4%	0.2%	0.3%
TOBACCO PRODUCTS INDUSTRIES	3.9%	3.5%	3.4%	3.6%	3.1%	2.8%	2.8%	1.2%
RUBBER PRODUCTS INDUSTRIES	2.2%	1.8%	2.3%	2.2%	0.0%	0.1%	0.1%	0.0%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	2.5%	2.4%	2.5%	2.5%
LEATHER AND ALLIED INDUSTRIES	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
PRIMARY TEXTILE INDUSTRIES	2.6%	2.2%	2.5%	1.9%	0.3%	0.3%	0.6%	0.6%
TEXTILE PRODUCTS INDUSTRIES	1.4%	1.3%	1.4%	1.2%	1.8%	1.6%	1.9%	2.2%
CLOTHING INDUSTRIES	1.3%	1.3%	1.0%	1.0%	1.9%	1.8%	1.8%	1.8%
WOOD INDUSTRIES	1.0%	1.5%	1.6%	1.9%	1.8%	2.1%	0.0%	2.4%
FURNITURE AND FIXTURE INDUSTRIES	1.0%	0.9%	1.0%	0.8%	0.9%	0.9%	0.9%	1.2%
PAPER AND ALLIED PRODUCTS INDUSTRIES	2.9%	3.2%	3.6%	3.5%	2.8%	2.9%	4.0%	5.3%
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	0.1%	0.1%	0.1%	0.3%	0.3%	0.4%	0.3%	0.4%
PRIMARY METAL INDUSTRIES	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
FABRICATED METAL PRODUCTS INDUSTRIES	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.3%	0.2%
MACHINERY INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TRANSPORTATION EQUIPMENT INDUSTRIES	0.3%	0.2%	0.2%	0.2%	0.5%	0.5%	0.4%	0.7%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%
NON-METALIC MINERAL PRODUCTS INDUSTRIES	2.9%	3.4%	3.4%	2.9%	3.7%	3.7%	4.2%	3.7%
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	5.6%	5.4%	6.1%	7.3%	7.1%	7.2%	8.2%	4.0%
OTHER MANUFACTURING INDUSTRIES	0.9%	0.7%	0.9%	0.9%	1.1%	0.9%	0.6%	0.5%
TOTAL	99.7%	99.7%	99.8%	100.0%	99.5%	99.7%	97.2%	96.8%
$ VALUE	206,698	251,341	296,398	285,660	308,181	346,635	358,806	394,610

RELATIVE USE BY INDUSTRY GROUP FOR EACH YEAR BY PACKAGING TYPE

MISCELLANEOUS (PAPER DRUMS AND CANS,CORES,CONES, ETC.)

MAJOR GROUP	1979	1980	1981	1982	1983	1984	1985	1986
FOOD INDUSTRIES	21.4%	22.6%	24.7%	24.5%	18.0%	25.1%	25.6%	27.9%
BEVERAGE INDUSTRIES	-	-	-	-	4.8%	5.4%	15.1%	17.4%
TOBACCO PRODUCTS INDUSTRIES	1.0%	1.2%	1.4%	1.3%	1.2%	0.0%	0.3%	0.4%
RUBBER PRODUCTS INDUSTRIES	1.6%	1.3%	1.1%	0.9%	0.6%	0.5%	0.7%	0.8%
PLASTIC PRODUCTS INDUSTRIES	-	-	-	-	0.9%	0.8%	1.0%	1.1%
LEATHER AND ALLIED INDUSTRIES	0.4%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.3%
PRIMARY TEXTILE INDUSTRIES	1.9%	5.6%	6.3%	4.9%	4.0%	4.6%	0.2%	0.1%
TEXTILE PRODUCTS INDUSTRIES	0.4%	0.5%	0.5%	0.4%	1.4%	1.4%	0.8%	1.1%
CLOTHING INDUSTRIES	0.9%	0.9%	1.0%	1.2%	1.3%	1.6%	1.5%	1.7%
WOOD INDUSTRIES	2.2%	2.9%	2.9%	2.8%	3.3%	4.6%	4.4%	0.4%
FURNITURE AND FIXTURE INDUSTRIES	1.1%	0.9%	1.1%	0.6%	0.7%	0.3%	0.1%	0.1%
PAPER AND ALLIED PRODUCTS INDUSTRIES	14.3%	13.7%	14.2%	13.3%	11.7%	12.9%	11.9%	12.1%
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	1.3%	1.4%	1.5%	1.4%	1.5%	1.1%	1.3%	1.2%
PRIMARY METAL INDUSTRIES	2.3%	2.2%	1.9%	2.0%	1.5%	0.6%	0.3%	0.2%
FABRICATED METAL PRODUCTS INDUSTRIES	4.2%	2.5%	3.5%	4.4%	3.4%	2.4%	2.0%	1.8%
MACHINERY INDUSTRIES	1.2%	1.7%	1.4%	0.5%	0.4%	0.3%	0.2%	0.1%
TRANSPORTATION EQUIPMENT INDUSTRIES	2.2%	1.9%	2.0%	0.7%	0.9%	0.7%	0.4%	0.2%
ELECTRICAL AND ELECTRONIC PRODUCTS INDUSTRIES	3.9%	3.8%	4.0%	3.2%	3.1%	5.2%	3.9%	3.5%
NON-METALIC MINERAL PRODUCTS INDUSTRIES	1.2%	1.1%	0.9%	0.7%	0.6%	0.7%	0.5%	0.7%
REFINED PETROLEUM AND COAL PRODUCTS INDUSTRIES	4.2%	5.0%	4.7%	3.2%	2.9%	1.4%	1.1%	0.4%
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	29.9%	28.1%	25.4%	32.8%	34.1%	26.5%	20.1%	13.0%
OTHER MANUFACTURING INDUSTRIES	1.0%	0.7%	0.0%	0.0%	1.0%	1.3%	0.4%	0.4%
TOTAL	96.6%	98.1%	98.8%	98.9%	97.1%	97.4%	91.8%	84.6%
$ VALUE	215,882	310,085	319,226	346,736	371,882	294,336	340,345	391,719

53906 A1

APPENDIX C

Estimated Tonnage of Packaging
Used By Sector, 1988

The data in this Appendix identify the total tonnage of packaging estimated to have been used by each industry sector in 1988. These estimates assume that expenditures on packaging are representative of packaging tonnage used, and that tonnage use of packaging types by different industry sectors is proportional to expenditure.

These assumptions are considered reasonable. However, in the case of wood packaging used, particularly, by the food and beverage industry sectors additional interpretation is required. These industries use returnable wood pallets almost exclusively, and the tonnage of wood packaging identified as being used by these industries therefore under-represents actual usage since expenditures associated with the use of a returnable pallet are lower than those associated with the use of a "one-way" pallet. The use of one-way pallet prevails in other industries.

ESTIMATED TONNAGE OF PACKAGING USED BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Folding and Set-Up boxes (% of sector packaging usage)	Folding and Set-Up boxes (tonnage)	Corrugated Boxes and Cartons (% of sector packaging usage)	Corrugated Boxes and Cartons (tonnage)	Cans, Metal (% of sector packaging usage)	Cans, Metal (tonnage)
FOOD INDUSTRIES	20.9%	388,485	26.2%	486,592	8.4%	155,053
BEVERAGE INDUSTRIES	4.4%	44,523	19.7%	197,678	15.5%	155,776
TOBACCO PRODUCT INDUSTRIES	80.8%	88,173	8.4%	9,124	3.0%	3,253
RUBBER PRODUCT INDUSTRIES	7.4%	1,746	38.9%	9,124	3.1%	723
PLASTIC PRODUCT INDUSTRIES	20.6%	27,063	46.3%	60,824	0.0%	0
LEATHER AND ALLIED PRODUCT INDUSTRIES	32.5%	6,984	63.6%	13,685	0.0%	0
PRIMARY TEXTILE INDUSTRIES	8.7%	1,746	53.2%	10,644	0.0%	0
TEXTILE PRODUCT INDUSTRIES	28.9%	18,333	45.6%	28,891	0.0%	0
CLOTHING INDUSTRIES	20.5%	12,222	30.6%	18,247	0.0%	0
WOOD INDUSTRIES	1.1%	873	11.8%	9,124	0.0%	0
FURNITURE AND FIXTURE INDUSTRIES	25.4%	22,698	57.9%	51,700	0.0%	0
PAPER AND ALLIED PRODUCT INDUSTRIES	15.9%	69,840	26.0%	114,045	N.A.	N.A.
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	9.5%	15,714	12.8%	21,288	0.0%	0
PRIMARY METAL INDUSTRIES	1.1%	873	11.4%	9,124	0.5%	361
FABRICATED METAL INDUSTRIES	9.5%	15,714	26.8%	44,097	N.A.	N.A.
MACHINERY INDUSTRIES	7.7%	3,492	20.2%	9,124	0.0%	0
TRANSPORTATION EQUIPMENT INDUSTRIES	9.5%	19,206	35.3%	71,468	0.0%	0
ELECTRICAL/ELECTRONIC PRODUCT INDUSTRIES	10.1%	20,079	45.0%	89,715	N.A.	N.A.
NON-METALIC MINERAL PRODUCT INDUSTRIES	0.4%	873	42.7%	103,401	0.1%	361
REFINED PETROLEUM AND COAL PRODUCT INDUSTRIES	0.0%	0	23.1%	4,562	7.3%	1,446
CHEMICAL AND CHEMICAL PRODUCT INDUSTRIES	16.9%	96,903	21.8%	124,689	8.0%	45,540
OTHER MANUFACTURING INDUSTRIES	16.1%	19,206	29.3%	34,974	0.3%	361
		874746		1522120		362874

"N.A." = Data was not available. Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

ESTIMATED TONNAGE OF PACKAGING USED BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Barrels and Drums (% of sector packaging usage)	Barrels and Drums (tonnage)	Glass Bottles and Carboys (% of sector packaging usage)	Glass Bottles and Carboys (tonnage)	Wrapping Paper Products (% of sector packaging usage)	Wrapping Paper Products (tonnage)
FOOD INDUSTRIES	0.1%	1,642	15.0%	278,640	8.8%	162,624
BEVERAGE INDUSTRIES	0.0%	0	47.1%	473,040	N.A.	N.A.
TOBACCO PRODUCT INDUSTRIES	0.0%	0	N.A.	N.A.	N.A.	N.A.
RUBBER PRODUCT INDUSTRIES	0.0%	0	0.0%	0	14.4%	3,379
PLASTIC PRODUCT INDUSTRIES	0.8%	1,026	0.0%	0	6.1%	8,026
LEATHER AND ALLIED PRODUCT INDUSTRIES	0.0%	0	0.0%	0	2.0%	422
PRIMARY TEXTILE INDUSTRIES	N.A.	N.A.	0.0%	0	8.4%	1,690
TEXTILE PRODUCT INDUSTRIES	0.0%	0	0.0%	0	8.0%	5,069
CLOTHING INDUSTRIES	0.0%	0	0.0%	0	35.4%	21,120
WOOD INDUSTRIES	0.0%	0	0.0%	0	21.4%	16,474
FURNITURE AND FIXTURE INDUSTRIES	0.0%	0	0.0%	0	7.1%	6,336
PAPER AND ALLIED PRODUCT INDUSTRIES	0.0%	0	0.0%	0	28.0%	122,918
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.0%	0	0.0%	0	5.3%	8,870
PRIMARY METAL INDUSTRIES	0.0%	0	0.0%	0	4.8%	3,802
FABRICATED METAL INDUSTRIES	1.7%	2,804	0.0%	0	1.5%	2,534
MACHINERY INDUSTRIES	0.5%	205	0.0%	0	0.9%	422
TRANSPORTATION EQUIPMENT INDUSTRIES	N.A.	N.A.	0.0%	0	N.A.	N.A.
ELECTRICAL/ELECTRONIC PRODUCT INDUSTRIES	N.A.	N.A.	0.0%	0	2.8%	5,491
NON-METALIC MINERAL PRODUCT INDUSTRIES	N.A.	N.A.	0.0%	0	10.8%	26,189
REFINED PETROLEUM AND COAL PRODUCT INDUSTRIES	1.0%	205	0.0%	0	N.A.	N.A.
CHEMICAL AND CHEMICAL PRODUCT INDUSTRIES	2.6%	14,843	10.3%	59,130	3.1%	17,741
OTHER MANUFACTURING INDUSTRIES	39.9%	47,675	N.A.	N.A.	9.5%	11,405
		68400		810810		424512

"N.A." = Data was not available. Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

ESTIMATED TONNAGE OF PACKAGING USED BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Wood		Plastics		Transparent Film	
	(% of sector packaging usage)	(tonnage)	(% of sector packaging usage)	(tonnage)	(% of sector packaging usage)	(tonnage)
FOOD INDUSTRIES	0.5%	9,528	8.1%	149,605	11.6%	216,013
BEVERAGE INDUSTRIES	0.9%	9,528	11.7%	117,977	0.1%	642
TOBACCO PRODUCT INDUSTRIES	0.0%	0	3.7%	4,016	2.4%	2,568
RUBBER PRODUCT INDUSTRIES	30.5%	7,146	2.1%	502	2.7%	642
PLASTIC PRODUCT INDUSTRIES	16.9%	22,232	2.7%	3,514	6.6%	8,666
LEATHER AND ALLIED PRODUCT INDUSTRIES	0.0%	0	0.0%	0	1.5%	321
PRIMARY TEXTILE INDUSTRIES	19.8%	3,970	2.5%	502	6.4%	1,284
TEXTILE PRODUCT INDUSTRIES	0.0%	0	2.4%	1,506	14.2%	8,987
CLOTHING INDUSTRIES	0.0%	0	0.8%	502	11.9%	7,061
WOOD INDUSTRIES	10.3%	7,940	39.8%	30,624	15.4%	11,876
FURNITURE AND FIXTURE INDUSTRIES	3.6%	3,176	1.1%	1,004	4.7%	4,173
PAPER AND ALLIED PRODUCT INDUSTRIES	17.9%	78,606	7.0%	30,624	5.2%	22,789
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	66.0%	109,572	4.5%	7,530	1.7%	2,889
PRIMARY METAL INDUSTRIES	71.7%	57,168	6.9%	5,522	3.6%	2,889
FABRICATED METAL INDUSTRIES	54.5%	89,722	5.5%	9,037	0.4%	642
MACHINERY INDUSTRIES	65.1%	29,378	5.6%	2,510	0.0%	0
TRANSPORTATION EQUIPMENT INDUSTRIES	49.9%	100,838	3.7%	7,530	1.6%	3,210
ELECTRICAL/ELECTRONIC PRODUCT INDUSTRIES	34.7%	69,078	6.6%	13,053	0.5%	963
NON-METALIC MINERAL PRODUCT INDUSTRIES	37.0%	89,722	3.5%	8,535	5.4%	13,160
REFINED PETROLEUM AND COAL PRODUCT INDUSTRIES	0.0%	0	68.5%	13,555	0.0%	0
CHEMICAL AND CHEMICAL PRODUCT INDUSTRIES	18.5%	105,602	16.1%	91,871	2.0%	11,234
OTHER MANUFACTURING INDUSTRIES	2.0%	2,382	1.7%	2,008	1.1%	1,284
		795588		501527		321293

"N.A." = Data was not available. Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

ESTIMATED TONNAGE OF PACKAGING USED BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Foil/Labels/Tags/Wrappers (% of sector packaging usage)	Foil/Labels/Tags/Wrappers (tonnage)	Total Tonnage
FOOD INDUSTRIES	0.4%	7,089	1,855,271
BEVERAGE INDUSTRIES	0.6%	5,821	1,004,985
TOBACCO PRODUCT INDUSTRIES	1.8%	2,016	109,150
RUBBER PRODUCT INDUSTRIES	0.9%	204	23,466
PLASTIC PRODUCT INDUSTRIES	0.0%	45	131,396
LEATHER AND ALLIED PRODUCT INDUSTRIES	0.4%	91	21,503
PRIMARY TEXTILE INDUSTRIES	0.9%	181	20,017
TEXTILE PRODUCT INDUSTRIES	0.9%	544	63,330
CLOTHING INDUSTRIES	0.7%	430	59,582
WOOD INDUSTRIES	0.1%	113	77,024
FURNITURE AND FIXTURE INDUSTRIES	0.2%	136	89,223
PAPER AND ALLIED PRODUCT INDUSTRIES	0.1%	317	439,139
PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.1%	204	166,067
PRIMARY METAL INDUSTRIES	0.0%	0	79,739
FABRICATED METAL INDUSTRIES	0.0%	68	164,618
MACHINERY INDUSTRIES	0.1%	23	45,154
TRANSPORTATION EQUIPMENT INDUSTRIES	0.0%	23	202,275
ELECTRICAL/ELECTRONIC PRODUCT INDUSTRIES	0.4%	770	199,149
NON-METALIC MINERAL PRODUCT INDUSTRIES	0.0%	113	242,354
REFINED PETROLEUM AND COAL PRODUCT INDUSTRIES	0.1%	23	19,791
CHEMICAL AND CHEMICAL PRODUCT INDUSTRIES	0.8%	4,326	571,880
OTHER MANUFACTURING INDUSTRIES	0.1%	136	119,431
		22673	5704544

"N.A." = Data was not available. Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

APPENDIX D

Estimated Market For Packaging Type By Sector, 1988

The data in this Appendix identify the total estimated tonnage of each packaging type used by each sector, and the proportion of total use of each packaging type accounted for by each sector.

The data in this Appendix have been prepared on the basis of the same assumptions as those noted to prepare the data in Appendix C. The same caveat with respect to wood packaging applies.

ESTIMATED MARKET FOR PACKAGING TYPE BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Folding and Set-Up Boxes		Corrugated Boxes and Cartons		Cans, metal	
	(% of market)	(tonnage)	(% of market)	(tonnage)	(% of market)	(tonnage)
FOOD INDUSTRIES	44.5	388,485	32	486,592	42.9	155,053
BEVERAGE INDUSTRIES	5.1	44,523	13	197,678	43.1	155,776
TOBACCO PRODUCT INDUSTRIES	10.1	88,173	0.6	9,124	0.9	3,253
RUBBER PRODUCTS INDUSTRIES	0.2	1,746	0.6	9,124	0.2	723
PLASTIC PRODUCTS INDUSTRY	3.1	27,063	4	60,824	0	0
LEATHER AND ALLIED PRODUCTS INDUSTRIES	0.8	6,984	0.9	13,685	0	0
PRIMARY TEXTILE INDUSTRIES	0.2	1,746	0.7	10,644	0	0
TEXTILE PRODUCTS INDUSTRIES	2.1	18,333	1.9	28,891	0	0
CLOTHING INDUSTRIES	1.4	12,222	1.2	18,247	0	0
WOOD INDUSTRIES	0.1	873	0.6	9,124	0	0
FURNITURE AND FIXTURE INDUSTRIES	2.6	22,698	3.4	51,700	0	0
PAPER AND ALLIED PRODUCTS INDUSTRIES	8	69,840	7.5	114,045	NA	NA
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	1.8	15,714	1.4	21,288	0	0
PRIMARY METAL INDUSTRIES	0.1	873	0.6	9,124	0.1	361
FABRICATED METAL INDUSTRIES	1.8	15,714	2.9	44,097	NA	NA
MACHINERY INDUSTRIES	0.4	3,492	0.6	9,124	0	0
TRANSPORTATION EQUIPMENT INDUSTRIES	2.2	19,206	4.7	71,468	0	0
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	2.3	20,079	5.9	89,715	NA	NA
NON-METALIC MINERAL PRODUCTS INDUSTRIES	0.1	873	6.8	103,401	0.1	361
REFINED PETROLEUM AND COAL PRODUCTS IND.	0	0	0.3	4,562	0.4	1,446
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	11.1	96,903	8.2	124,689	12.6	45,540
OTHER MANUFACTURING INDUSTRIES	2.2	19,206	2.3	34,974	0.1	361
	100	873000	100	1520600	100	361430

NA" ... Data was not available, Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

ESTIMATED MARKET FOP PACKAGING TYPE BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Barrels and Drums		Glass Bottles and Carboys		Wrapping Paper Products	
	(% of market)	(tonnage)	(% of market)	(tonnage)	(% of market)	(tonnage)
FOOD INDUSTRIES	2.4	1,642	34.4	278,640	38.5	162,624
BEVERAGE INDUSTRIES	0	0	58.4	473,040	NA	NA
TOBACCO PRODUCT INDUSTRIES	0	0	NA	NA	NA	NA
RUBBER PRODUCTS INDUSTRIES	0	0	0	0	0.8	3,379
PLASTIC PRODUCTS INDUSTRY	1.5	1,026	0	0	1.9	8,026
LEATHER AND ALLIED PRODUCTS INDUSTRIES	0	0	0	0	0.1	422
PRIMARY TEXTILE INDUSTRIES	NA	NA	0	0	0.4	1,690
TEXTILE PRODUCTS INDUSTRIES	0	0	0	0	1.2	5,069
CLOTHING INDUSTRIES	0	0	0	0	5	21,120
WOOD INDUSTRIES	0	0	0	0	3.9	16,474
FURNITURE AND FIXTURE INDUSTRIES	0	0	0	0	1.5	6,336
PAPER AND ALLIED PRODUCTS INDUSTRIES	0	0	0	0	29.1	122,918
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	0	0	0	0	2.1	8,870
PRIMARY METAL INDUSTRIES	0	0	0	0	0.9	3,802
FABRICATED METAL INDUSTRIES	4.1	2,804	0	0	0.6	2,534
MACHINERY INDUSTRIES	0.3	205	0	0	0.1	422
TRANSPORTATION EQUIPMENT INDUSTRIES	NA	NA	0	0	NA	NA
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	NA	NA	0	0	1.3	5,491
NON-METALIC MINERAL PRODUCTS INDUSTRIES	NA	NA	0	0	6.2	26,189
REFINED PETROLEUM AND COAL PRODUCTS IND.	0.3	205	0	0	NA	NA
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	21.7	14,843	7.3	59,130	4.2	17,741
OTHER MANUFACTURING INDUSTRIES	69.7	47,675	NA	NA	2.7	11,405
	100	68400	100	810000	101	422400

NA" ... Data was not available, Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

ESTIMATED MARKET FOR PACKAGING TYPE BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Wood		Plastics		Transparent Film	
	(% of market)	(tonnage)	(% of market)	(tonnage)	(% of market)	(tonnage)
FOOD INDUSTRIES	1.2	9,528	29.8	149,605	67.3	216,013
BEVERAGE INDUSTRIES	1.2	9,528	23.5	117,977	0.2	642
TOBACCO PRODUCT INDUSTRIES	0	0	0.8	4,016	0.8	2,568
RUBBER PRODUCTS INDUSTRIES	0.9	7,146	0.1	502	0.2	642
PLASTIC PRODUCTS INDUSTRY	2.8	22,232	0.7	3,514	2.7	8,666
LEATHER AND ALLIED PRODUCTS INDUSTRIES	0	0	0	0	0.1	321
PRIMARY TEXTILE INDUSTRIES	0.5	3,970	0.1	502	0.4	1,284
TEXTILE PRODUCTS INDUSTRIES	0	0	0.3	1,506	2.8	8,987
CLOTHING INDUSTRIES	0	0	0.1	502	2.2	7,061
WOOD INDUSTRIES	1	7,940	6.1	30,624	3.7	11,876
FURNITURE AND FIXTURE INDUSTRIES	0.4	3,176	0.2	1,004	1.3	4,173
PAPER AND ALLIED PRODUCTS INDUSTRIES	9.9	78,606	6.1	30,624	7.1	22,789
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	13.8	109,572	1.5	7,530	0.9	2,889
PRIMARY METAL INDUSTRIES	7.2	57,168	1.1	5,522	0.9	2,889
FABRICATED METAL INDUSTRIES	11.3	89,722	1.8	9,037	0.2	642
MACHINERY INDUSTRIES	3.7	29,378	0.5	2,510	0	0
TRANSPORTATION EQUIPMENT INDUSTRIES	12.7	100,838	1.5	7,530	1	3,210
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	8.7	69,078	2.6	13,053	0.3	963
NON-METALIC MINERAL PRODUCTS INDUSTRIES	11.3	89,722	1.7	8,535	4.1	13,160
REFINED PETROLEUM AND COAL PRODUCTS IND.	0	0	2.7	13,555	0	0
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	13.3	105,602	18.3	91,871	3.5	11,234
OTHER MANUFACTURING INDUSTRIES	0.3	2,382	0.4	2,008	0.4	1,284
	100	794000	100	502030	100	320970

NA" ... Data was not available, Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.

ESTIMATED MARKET FOR PACKAGING TYPE BY INDUSTRY SECTOR, 1988

INDUSTRY SECTOR	Foil/Labels Tags/Wrappers (% of market)	(tonnage)	Total Tonnage
FOOD INDUSTRIES	31.3	7,089	1,855,271
BEVERAGE INDUSTRIES	25.7	5,821	1,004,985
TOBACCO PRODUCT INDUSTRIES	8.9	2,016	109,149
RUBBER PRODUCTS INDUSTRIES	0.9	204	23,465
PLASTIC PRODUCTS INDUSTRY	0.2	45	131,396
LEATHER AND ALLIED PRODUCTS INDUSTRIES	0.4	91	21,503
PRIMARY TEXTILE INDUSTRIES	0.8	181	20,017
TEXTILE PRODUCTS INDUSTRIES	2.4	544	63,330
CLOTHING INDUSTRIES	1.9	430	59,583
WOOD INDUSTRIES	0.5	113	77,023
FURNITURE AND FIXTUR. INDUSTRIES	0.6	136	89,223
PAPER AND ALLIED PRO CTS INDUSTRIES	1.4	317	439,139
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	0.9	204	166,068
PRIMARY METAL INDUSTRIES	0	0	79,739
FABRICATED METAL INDUSTRIES	0.3	68	164,619
MACHINERY INDUSTRIES	0.1	23	45,154
TRANSPORTATION EQUIPMENT INDUSTRIES	0.1	23	202,275
ELECTRICAL/ELECTRONIC PRODUCTS INDUSTRIES	3.4	770	199,149
NON-METALIC MINERAL PRODUCTS INDUSTRIES	0.5	113	242,354
REFINED PETROLEUM AND COAL PRODUCTS IND.	0.1	23	19,790
CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	19.1	4,326	571,880
OTHER MANUFACTURING INDUSTRIES	0.6	136	119,431
	100	22650	5704544

NA" ... Data was not available, Statistics Canada Confidentiality Act.

NOTE: A maximum of 0.2% discrepancy exists in packaging subtotals between tables in Appendix C and Appendix D due to rounding errors.